The PHOTOFACT Servicer

SET 450 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ July 1959

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This Servicer provides you with essential data on other models or special equipment not covered in standard PHOTOFACT folders. The schematics and supplementary data included here will be of valuable help to you in servicing this equipment.

IN THIS ISSUE OF THE SERVICER:

Fisher Series 202

Hallicrafters Models

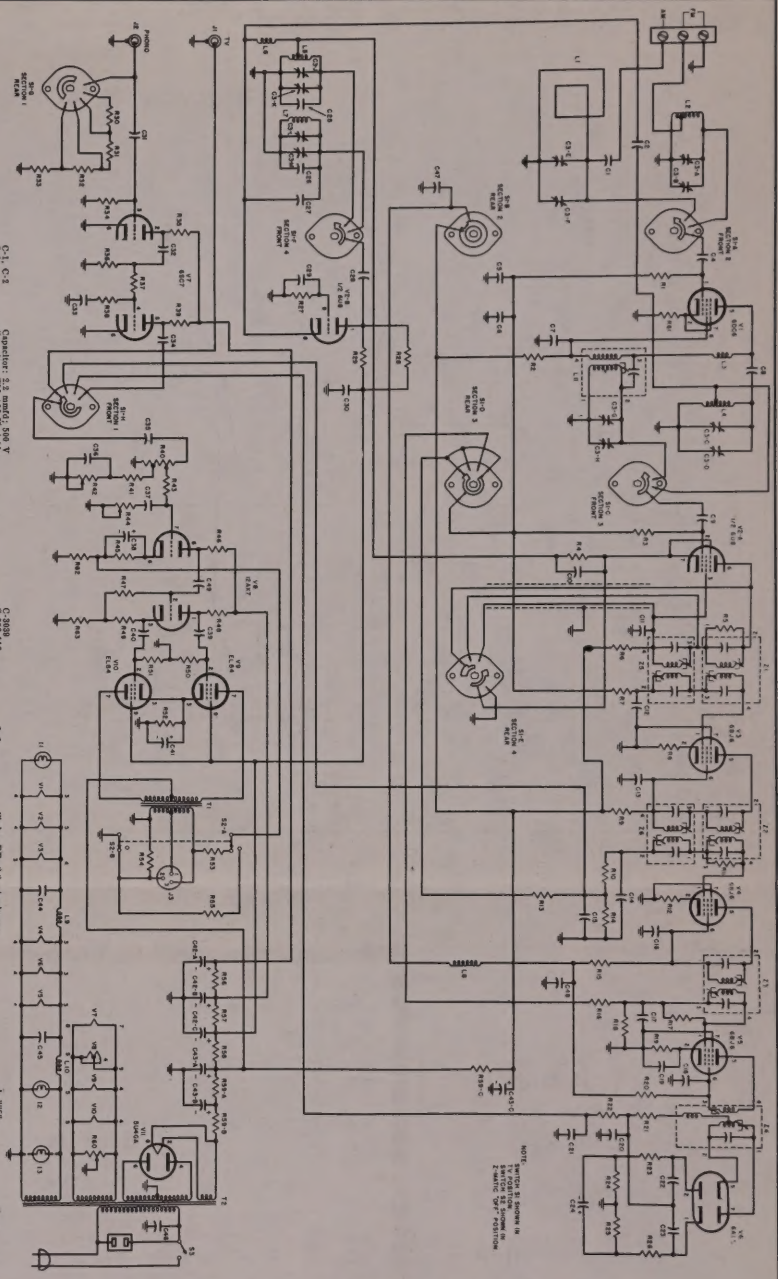
51C1, 51C1A,

51C2, 51C2A,

(Run-1)

FISHER

SERIES 202



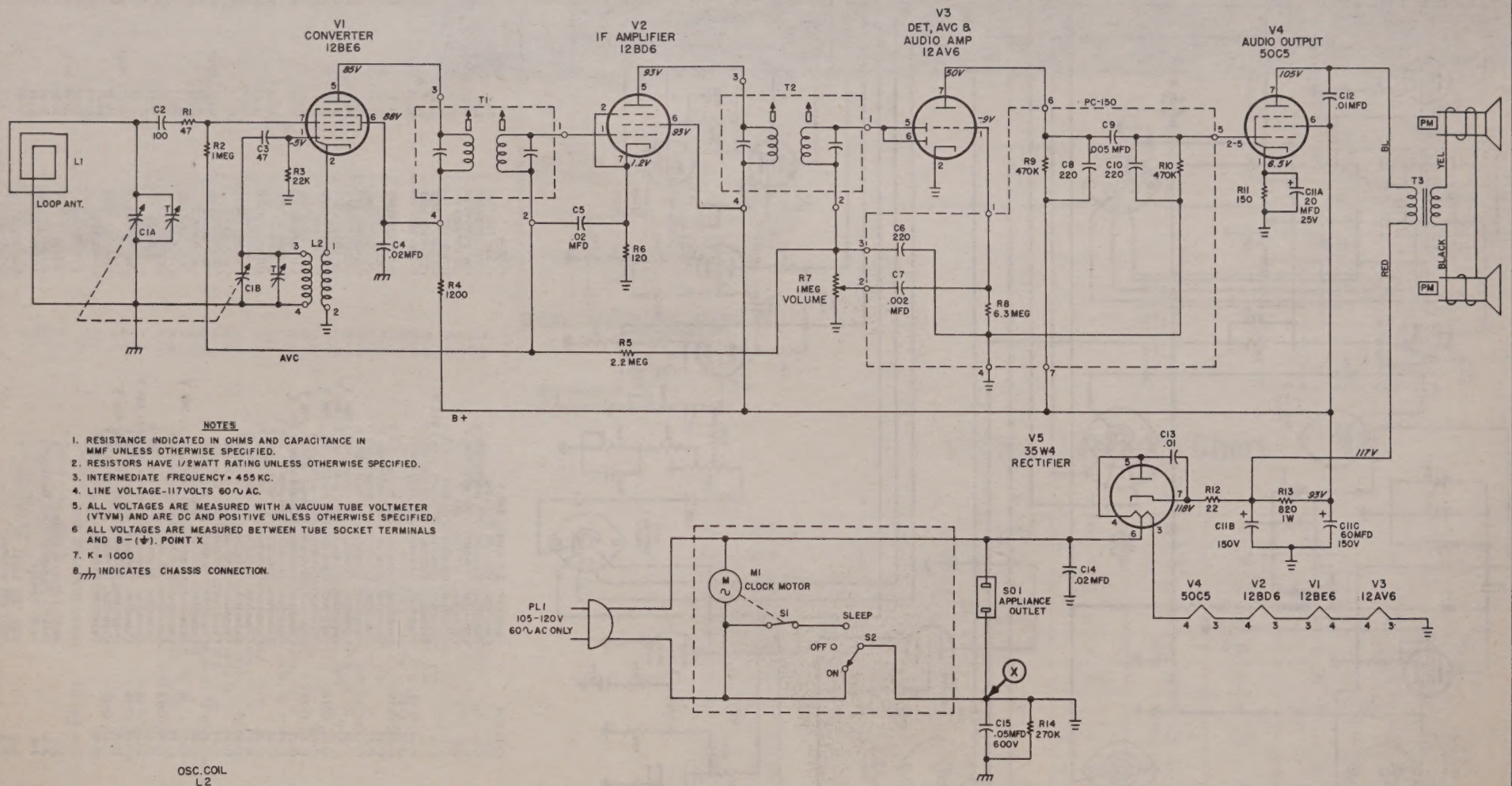
Voltage Reference Chart

TUBE		1	2	3	4	5	6	7	8	9
V1	6DC6	–.7	.5	6.3AC	0	100	100	0	—	—
V2	6U8	125	–2.4	100	0	6.3AC	100	0	—	–4.4
V3	6BJ6	–.65	.75	0	6.3AC	95	95	0	—	—
V4	6BJ6	0	1	6.3AC	0	95	95	0	—	—
V5	6BJ6	–.1	1	6.3AC	0	95	95	0	—	—
V6	6AL5	2.4	–2.15	0	6.3AC	.2	0	.3	—	—
V7	6SC7	0	110	–.9	–1.1	110	0	AC Fil.*	AC Fil.*	—
V8	12AX7	225	25	65	AC Fil.*	AC Fil.*	140	0	1.5	AC Fil.*
V9	EL84	—	0	11	AC Fil.*	AC Fil.*	—	340	—	300
V10	EL84	—	0	11	AC Fil.*	AC Fil.*	—	340	—	300
V11	5U4GA	—	360	—	335 AC	—	335AC	—	360	—

* This voltage will vary with the setting of R-60 from 6.3AC to zero.

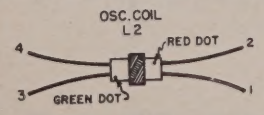
Notes: Line voltage set at 117 V., 60 cycles. Voltage readings may vary ± 10% under normal operating conditions. All voltages read with a vacuum tube voltmeter under no-signal conditions. Band switch set at FM. Volume control at minimum, bass control at minimum, treble control at maximum, Z-Matic off. All voltages read with respect to chassis. Readings are in positive volts, DC, unless otherwise specified.

Schematic Diagram Courtesy of Fisher Radio Corp.



NOTES

1. RESISTANCE INDICATED IN OHMS AND CAPACITANCE IN MMF UNLESS OTHERWISE SPECIFIED.
2. RESISTORS HAVE 1/2WATT RATING UNLESS OTHERWISE SPECIFIED.
3. INTERMEDIATE FREQUENCY = 455 KC.
4. LINE VOLTAGE-117VOLTS 60~AC.
5. ALL VOLTAGES ARE MEASURED WITH A VACUUM TUBE VOLTMETER (VTVM) AND ARE DC AND POSITIVE UNLESS OTHERWISE SPECIFIED.
6. ALL VOLTAGES ARE MEASURED BETWEEN TUBE SOCKET TERMINALS AND 8-(⏚). POINT X
7. K = 1000
8. ⏚ INDICATES CHASSIS CONNECTION.



HALLICRAFTERS MODELS 51C1, 51C1A, 51C2, 51C2A (Run-1)

Schematic Diagram Courtesy of Hallicrafters Co.

PHOTOFACT* Folder

with CIRCUITRACE*

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

SILVERTONE CHASSIS 456.52160, 161, 162, 163, 166, 167, 170, 171, 172, 173, 174, 180, 181, 182, 183, 184, 186, 187, 190, 191, 192, 193, 194, 528.52160, 161, 162, 163, 166, 167, 170, 171, 172, 173, 174, 180, 181, 182, 183, 184, 186, 187, 190, 191, 192, 193, 194, 528.53190, 191, 528.59200

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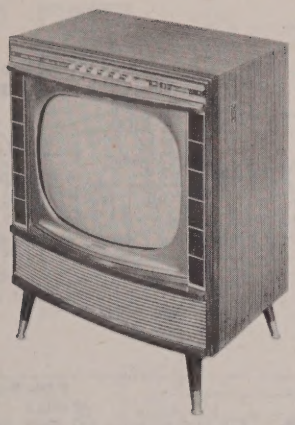
SET 450 FOLDER 1

PHOTOFACT* Folder

with CIRCUITRACE*

SILVERTONE CHASSIS 456.52160, 161, 162, 163, 166, 167, 170, 171, 172, 173, 174, 180, 181, 182, 183, 184, 186, 187, 190, 191, 192, 193, 194, 528.52160, 161, 162, 163, 166, 167, 170, 171, 172, 173, 174, 180, 181, 182, 183, 184, 186, 187, 190, 191, 192, 193, 194, 528.53190, 191, 528.59200



MODEL 9160A (Ch. 528.52167)

CAUTION

ONE SIDE OF AC LINE CONNECTED TO CHASSIS.

Care should be exercised when connecting test equipment or physically contacting chassis. Isolation devices employed by manufacturer should be checked and properly connected before returning receiver to owner.

TRADE NAME Silvertone	MODELS	CHASSIS	MODELS	CHASSIS
	PC-9160A, PC-9162A, PC-9184A,		9160A, 9162A, 9184A, 9186A,	
	PC-9186A, PC-9188A, PC-9189A	456.52160	9188A, 9189A	528.52163
		456.52161		528.52166
		456.52162		528.52167
		456.52163	9161A, 9163A, 9185A, 9187A,	
		456.52166	9188.5A, 9189.5A	528.52170
		456.52167		528.52171
	PC-9161A, PC-9163A, PC-9185A,			528.52172
	PC-9187A, PC-9188.5A, PC-9189.5A ..	456.52170		528.52173
		456.52171		528.52174
		456.52172	9194, 9196	528.52180
		456.52173		528.52181
		456.52174		528.52182
	PC-9194, PC-9196	456.52180		528.52183
		456.52181		528.52184
		456.52182		528.52186
		456.52183		528.52187
		456.52184	9195, 9197	528.52190
		456.52186		528.52191
		456.52187		528.52192
	PC-9195, PC-9197	456.52190		528.52193
		456.52191		528.52194
		456.52192	PC-9194, PC-9195, PC-9196, PC-9197,	
		456.52193	9194, 9195, 9196, 9197 ....(Amp)	528.59200
		456.52194	(Record Changer).	528.56460*
	9160A, 9162A, 9184A, 9186A,		(Record Changer).	528.56472*
	9188A, 9189A	528.52160	7777 .....(Radio)	528.53190
		528.52161	7777A.....(Radio)	528.53191
		528.52162		

SUPPLIER	Sears, Roebuck & Co., 925 S. Homan Avenue, Chicago, Illinois
TYPE SET	Television Receiver With Remote Control
TUBES	VHF-Sixteen, UHF-Seventeen
POWER SUPPLY	110-120 Volts AC, 60 Cycle RATING TV: 155 Watts, 1.5 Amp. @ 117 Volts AC (While Tuning) 180 Watts, 1.7 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

* FOR SERVICE INFORMATION SEE SIMILAR UNIT IN PHOTOFACT SET 417 FOLDER 10.

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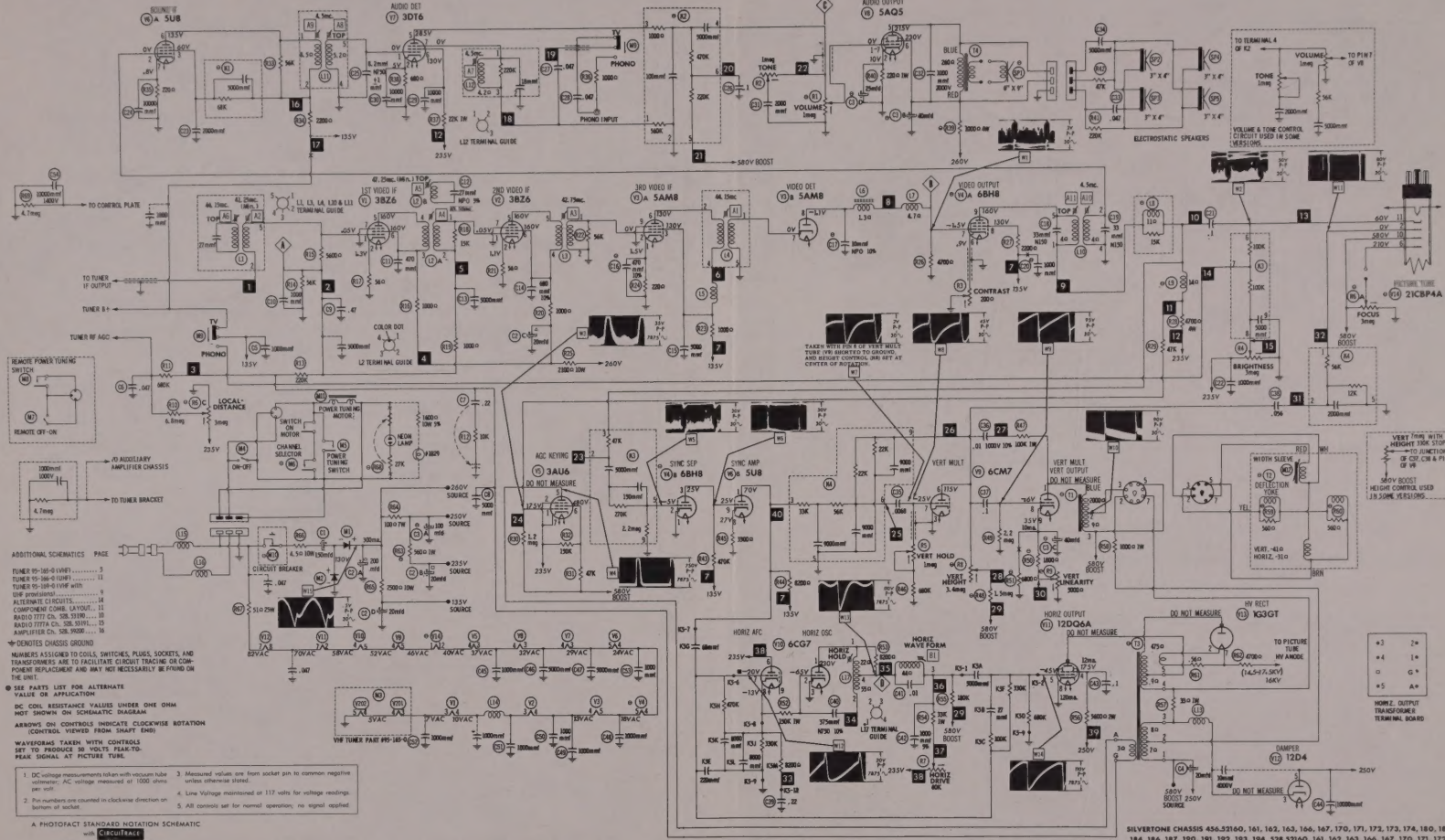
JA332

SET 450 FOLDER 1



ADDITIONAL SCHEMATICS PAGE

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TUNER 95-169-0 (VHF with UHF provisions) 9
ALTERNATE CIRCUITS 14
COMPONENT COMPL LAYOUT 11
RADIO 7777 Ch. 528, 53190 10
RADIO 7777A Ch. 528, 53191 15
AMPLIFIER Ch. 528, 59200 16

⏚ DENOTES CHASSIS GROUND

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 30 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1000 ohms per volt.
2. Pin numbers are counted in clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line Voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

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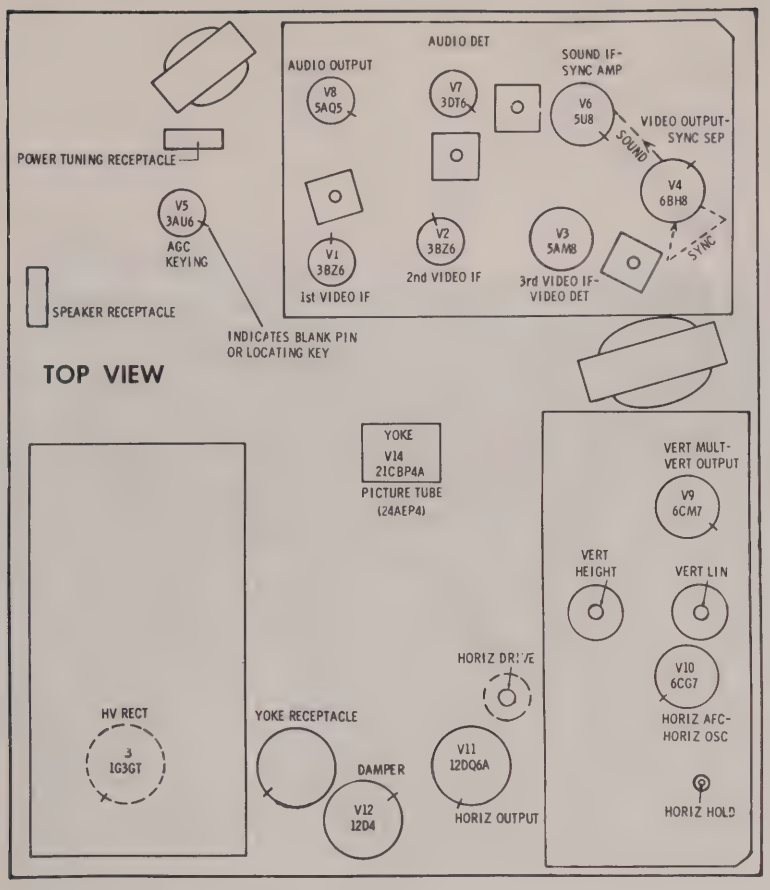
SILVERTONE CHASSIS 456-52160, 161, 162, 163, 166, 167, 170, 171, 173, 173, 174, 180, 181, 182, 183, 184, 186, 187, 190, 191, 192, 193, 194, 528-52160, 161, 162, 163, 166, 167, 170, 171, 172, 173, 174, 180, 181, 182, 183, 184, 186, 187, 190, 191, 192, 193, 194, 528-53190, 191, 528-59200

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

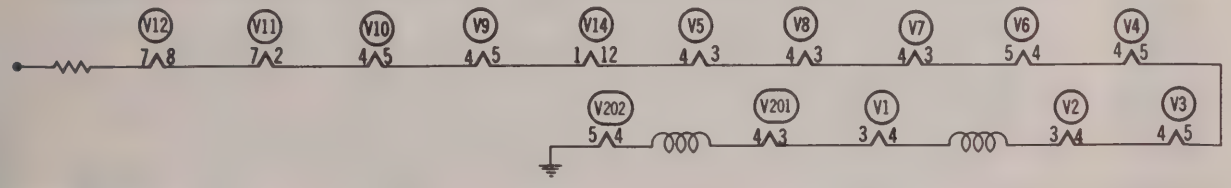
POWER SUPPLY FAILURE
No raster, no sound Circuit Breaker, Rect. (B+)

SWEEP FAILURE
No raster, has sound V10, V11, V12, V13, V14
No vertical deflection V9
Poor vert. linearity or foldover V9
Poor horiz. linearity or foldover V10, V11, V12
Narrow picture Rect. (B+), V10, V11, V12
Vert. off freq. V9
Horiz. off freq. V10

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, V4
No pic, no sound, has snow V201, V202
No pic, has sound, has raster V4, V14
Has pic, no sound V6, V7, V8
Overloaded picture V5

SYNC FAILURE
No vert. sync V4, V6
No horiz. sync V4, V6, V10
No vert. or horiz. sync V4, V6

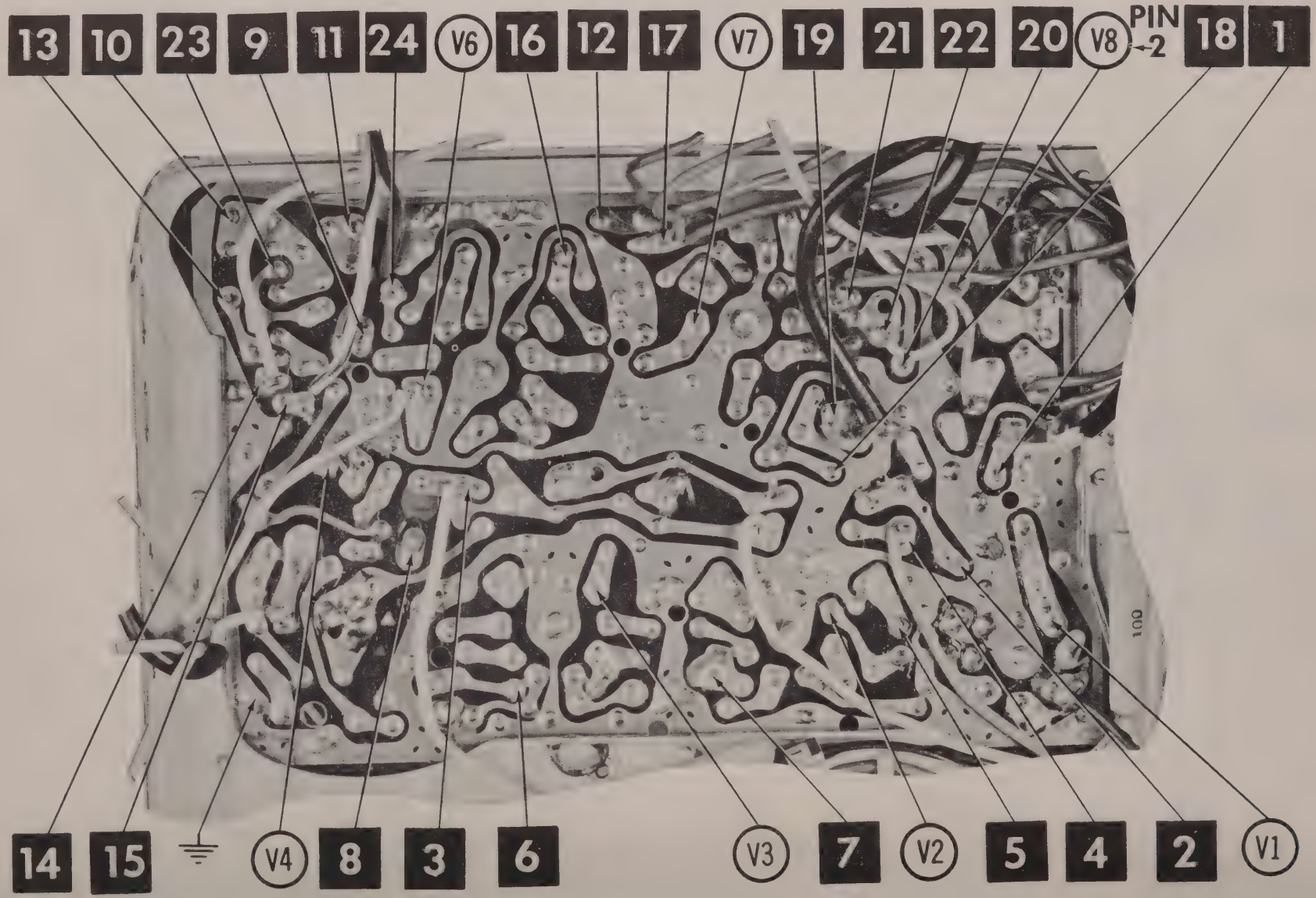
This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)



SILVERTONE CHASSIS 456.52160, 161, 162, 163, 166, 167, 170, 171, 172, 173, 174, 180, 181, 182, 183, 184, 186, 187, 190, 191, 192, 193, 194, 528.52160, 161, 162, 163, 166, 167, 170, 171, 172, 173, 174, 180, 181, 182, 183, 184, 186, 187, 190, 191, 192, 193, 194, 528.53190, 191, 528.59200

FOLDER 1

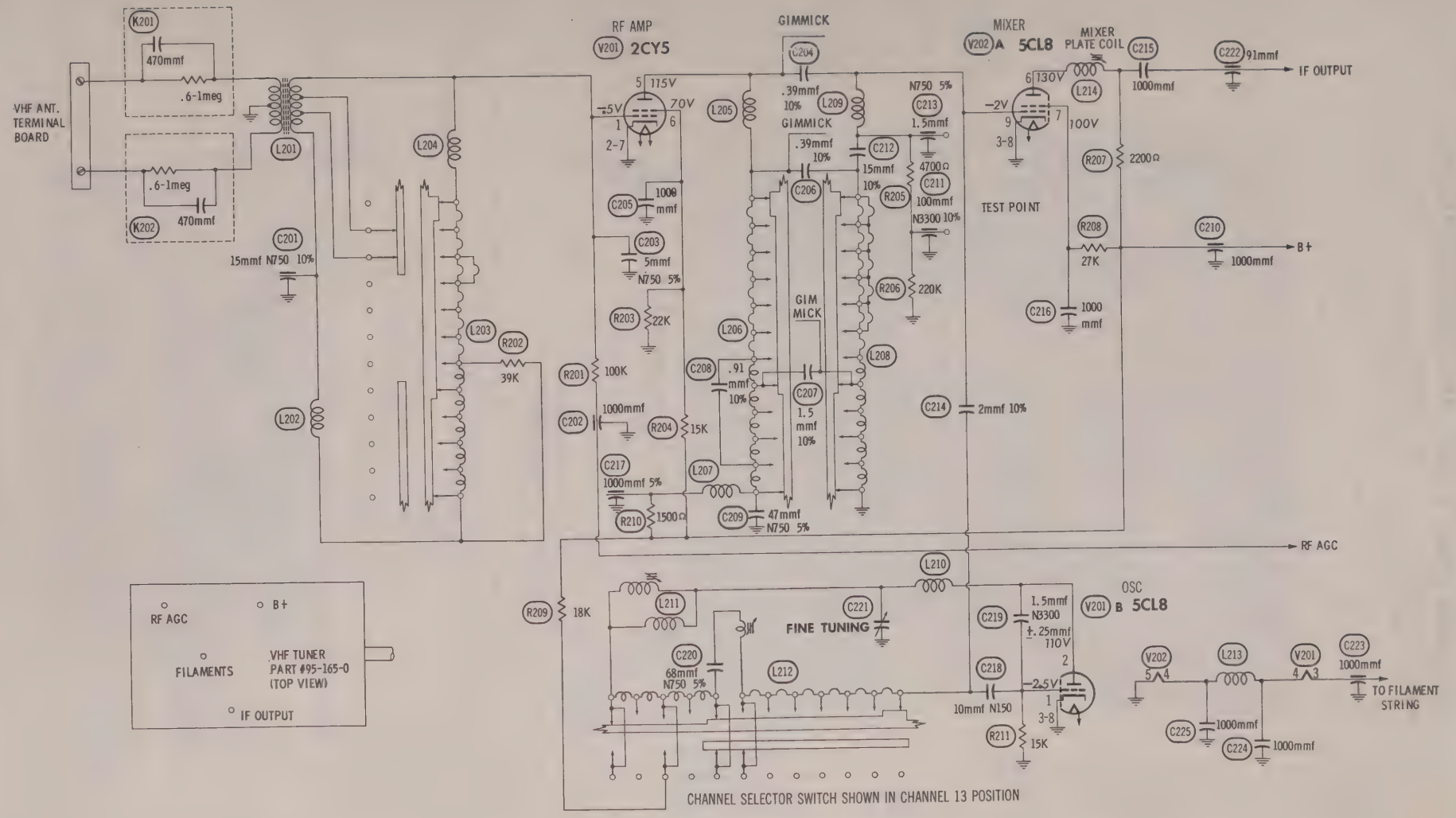
CircuiTrace Numbers 1 thru 24



A Howard W. Sams CIRCUITRACE® Photo

IF, SYNC & SOUND
PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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VHF TUNER 95-165-0

TUNER PARTS LIST AND DESCRIPTIONS

95-165-0

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	2CY5	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	5CL8	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	15		N750 10%	258-150						
C202	1000			244-1	EF-001	MFT-1000			503C-D1	
C203	5		N750 5%	225-509	N750-D1 5	DTN-5	C10V5U		5TCU B-V5S 5% *	
C204	.39		10%	2101-398						
C205	1000			2033-23	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C206	.39		10%	2101-398						
C207	1.5		10%	2101-159	NPO-SI 1.5	TCZ-1R5	C10V15C	ZT-5515	5TCCB-V15S 10%*	
C208	.91		10%	2101-918						
C209	47		N750 5%	233-470		DTN-47	C10Q47U	CN7-447	5TCU-Q47S 5% *	
C210	1000			271-1	EF-001	MFT-1000			503C-D1	
C211	100		N3300 10%	252-101						
C212	15		10%	222-150	NPO-D1 15	DD-150	L10Q15	CNO-415	5GA-Q15S 10% *	
C213	1.5		N750 5%	259-159						
C214	2		10%	2101-209	NPO-SI 2		C10V2C		5TCCB-V2S 10%*	
C215	1000			2033-23	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C216	1000			2033-23	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C217	1000		5%	244-1	EF-001	MFT-1000			503C-D1	
C218	10		N150	164-100						
C219	1.5		N3300 ±.25mmf	166-159						
C220	68		N750 5%	233-680		DTN-68	C10Q68U	CN7-468	5TCU-Q68S 5% *	
C221				1713-512						
C222	91			262-910						
C223	1000			244-1	EF-001	MFT-1000			503C-D1	
C224	1000			2033-23	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C225	1000			2033-23	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		SILVERTONE PART No.	NOTES
	OHMS	WATT		
R201	100K		106-104	
R202	39K		106-393	
R203	22K		106-223	
R204	15K		106-153	
R205	4700Ω		106-472	
R206	220K		111-224	

ITEM No.	RATING		SILVERTONE PART No.	NOTES
	OHMS	WATT		
R207	2200Ω		106-222	
R208	27K		106-273	
R209	18K		106-183	
R210	1500Ω		106-152	
R211	15K		106-153	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SILVERTONE PART No.	REPLACEMENT DATA
K201	Ant. Isolation	470mmf, .6-1meg	330-1	Sprague AC1-1
K202	Ant. Isolation	470mmf, .6-1meg	330-1	Sprague AC1-1

COILS (RF-IF)

ITEM No.	USE	SILVERTONE PART No.	NOTES
L201	Ant. Trans.	2309-5	
L202	RF Choke	310-4	
L203	Ant. Coils	2343-1	Channel 2-13, Includes wafer assembly
L204	RF Choke	310-4	
L205	RF Choke	313-7	
L206	RF Coils	2344-1	Channel 2-13, Includes wafer assembly
L207	RF Choke	301-23	

ITEM No.	USE	SILVERTONE PART No.	NOTES
L208	Mixer Grid Coils	2344-1	Channel 2-13 Includes wafer assembly
L209	RF Choke	312-6	
L210	RF Choke	300-4	
L211	RF Choke	312-9	
L212	Osc. Coils	2717-1	Channel 2-13, Includes wafer assembly
L213	Fil. Choke	300-20	
L214	Mixer Plate Coil	2110-9	

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

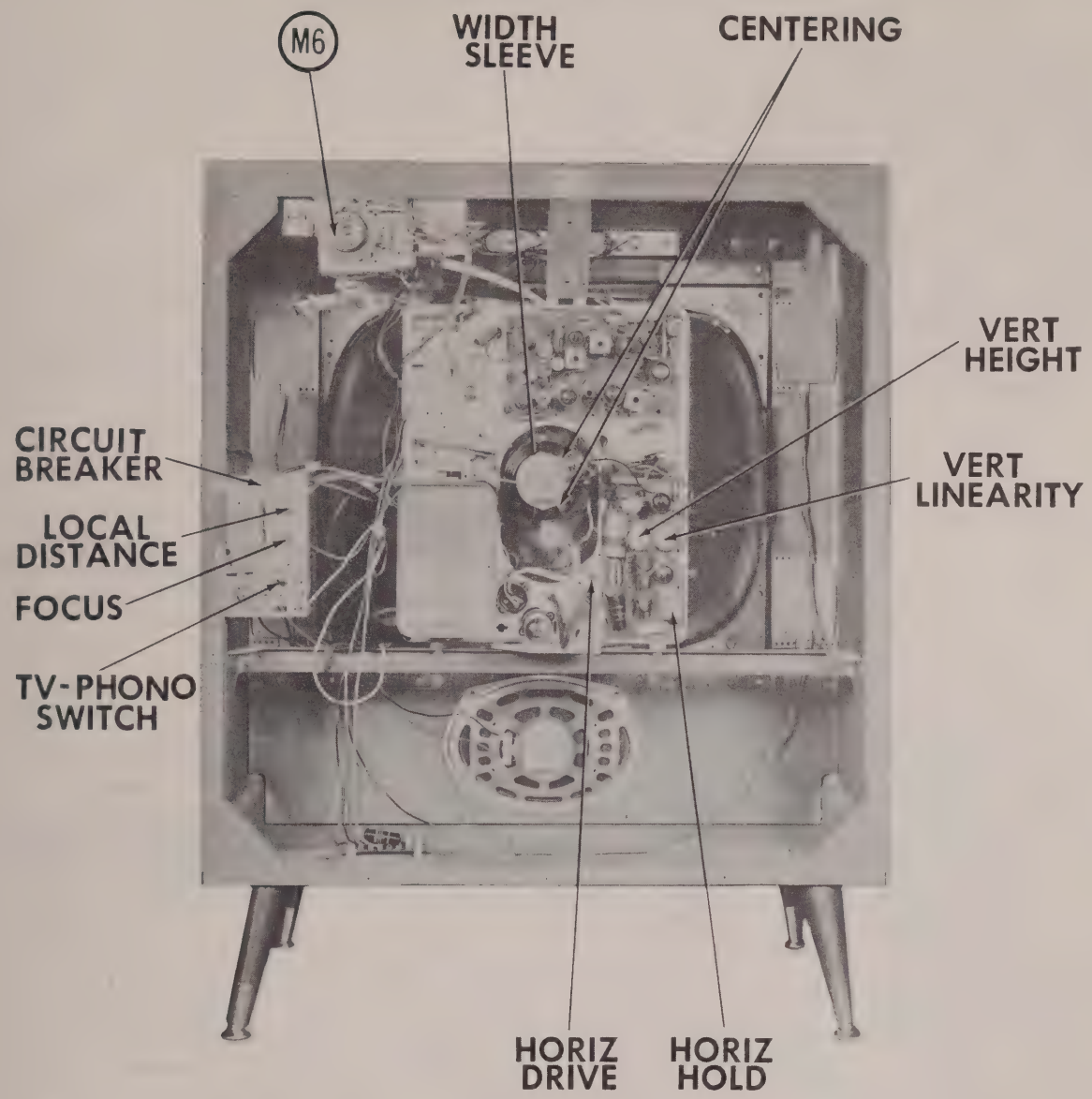
Use an ISOLATION TRANSFORMER TO PROTECT the Test Equipment.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: GENERAL CEMENT #5000, 5003, 5014, 5015, 5016, 8276, 8290
WALSCO #2512, 2515, 2522, 2523, 2525, 2537

VHF OSCILLATOR ALIGNMENT

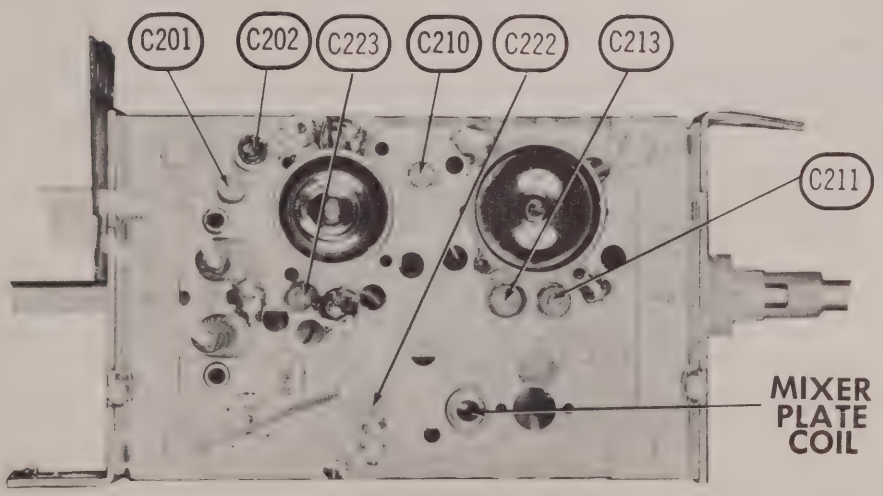
Turn the set on and allow 15 minute warm-up period. Set the Fine Tuning to the center of its range. This is accomplished by turning the Fine Tuning so that the dot on the drive wheel is aligned with the dot on tuning housing.
Turn the Channel Selector to the highest frequency channel operating in the area. Adjust the proper oscillator adjustment screw for clearest picture. The oscillator adjustment screws are identified by the channel number stamped into the metal next to the proper adjustment opening.
Channels 7 and 8 share the same screw for adjustment, all others have separate adjustment screws.
Be very careful not to turn any of the adjustment screws too far counterclockwise or they will fall out.
Always adjust the highest operating channel first, then the others in descending order.

VHF RF AND MIXER ALIGNMENT

This portion of the tuner has been properly aligned at the factory and is very stable. Alignment of this portion should not be attempted in the field.



CABINET REAR VIEW



TUNER 95-165-0 TOP VIEW

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Use an ISOLATION TRANSFORMER TO PROTECT the Test Equipment.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

VIDEO IF ALIGNMENT

Short the antenna terminals together, but not to chassis.
Connect the negative lead of a 3 volt bias supply to point (A). Positive to chassis.
Detune A1, A4, A5, A6, and Mixer Plate Coil by turning the cores almost out of the coil forms.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	Place a thin insulated metal strip between the Mixer-Osc. tube (V202), and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	44.15MC (Unmod)	Any non-interfering channel	DC probe thru 10K to point (B). Common to chassis. (Across Video Det. load)	A1, A2, & Mixer Plate Coil	Attenuate generator output to maintain not more than 2 volts on VTVM. Adjust for maximum deflection.
2.	"	"	42.75MC	"	"	A3	"
3.	"	"	45.55MC	"	"	A4	"
4.	"	"	47.25MC	"	"	A5	Increase generator output. Adjust A5 for MINIMUM deflection. Repeat steps 3 and 4.
5.	"	"	41.25MC	"	"	A6 .	Adjust for MINIMUM deflection.

OVERALL VIDEO IF RESPONSE CHECK

Short the antenna terminals together, but not to chassis.
Attenuate sweep generator output to maintain not more than 2 volts peak to peak on scope.
If separate marker generator is used, couple loosely to output cable of sweep generator.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	Place a thin insulated metal strip between the Mixer-Osc. tube (V202), and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	44.25MC (10MC Swp)	41.25MC 42.55MC 43.8MC 44.15MC 45.0MC 45.75MC 47.25MC	Any non-interfering channel	Vert. Amp. thru 10K to point (B). Low side to chassis.		Check for response similar to Fig. 1. If necessary, retouch Mixer Plate Coil to place 45.75MC marker at 50%. Retouch A1 for proper tilt.

SOUND IF ALIGNMENT

Connect the negative lead of a 5 volt bias supply to point (A). Positive to chassis.
Set Contrast control fully clockwise.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.05mfd	High side to point (B). Low side to chassis. (.1 volt output)	4.5MC (400% FM 15KC Swp)	Any non-interfering channel	AC probe to point (C). Common to chassis.	A7, A8	Adjust for maximum deflection. If two peaks are found, use the greater peak.
2.	"	High side to point (B). Low side to chassis. (500 microvolts)	"	"	"	A9, A10	Adjust for maximum deflection. Retouch A8 for maximum deflection.

4.5MC TRAP ALIGNMENT

Tune in a TV signal and adjust the Fine Tuning until a 4.5MC beat interference is noted in the picture. Adjust A11 until the horizontal scanning lines are smooth and continuous.

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGE 6

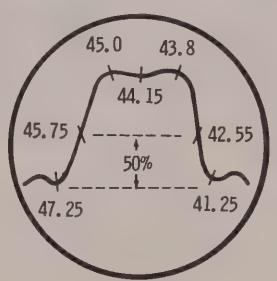
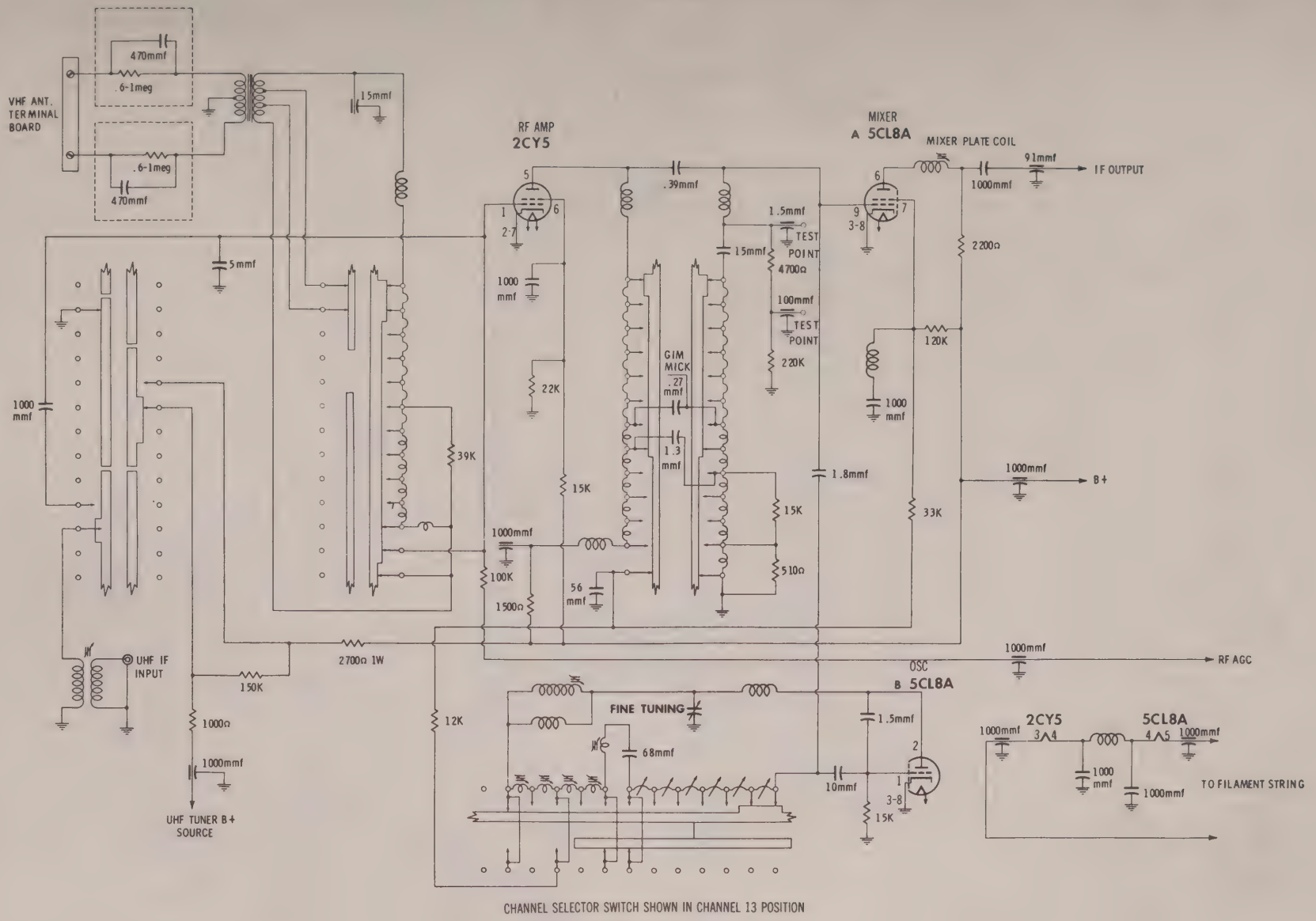


FIG.1



CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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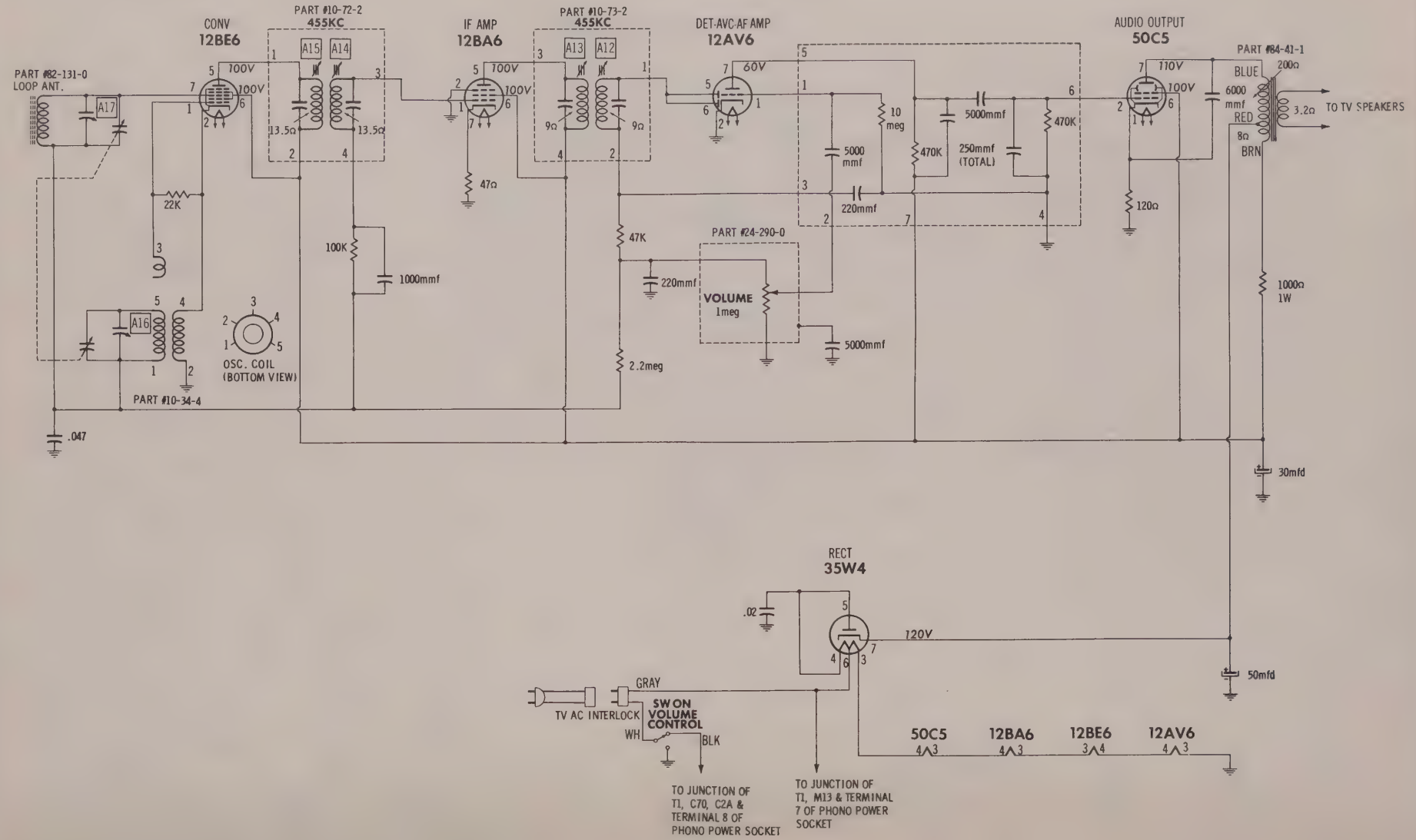
VHF TUNER with UHF provisions 95-169-0



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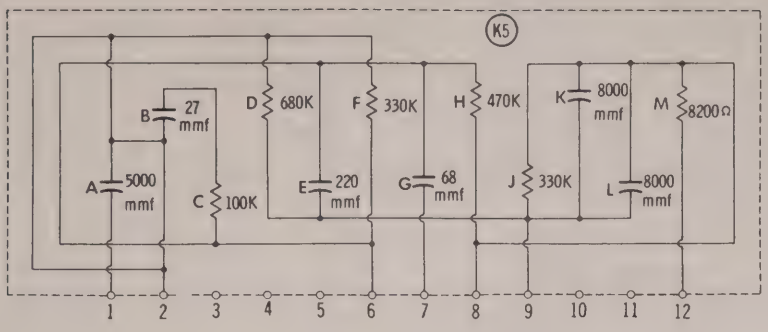
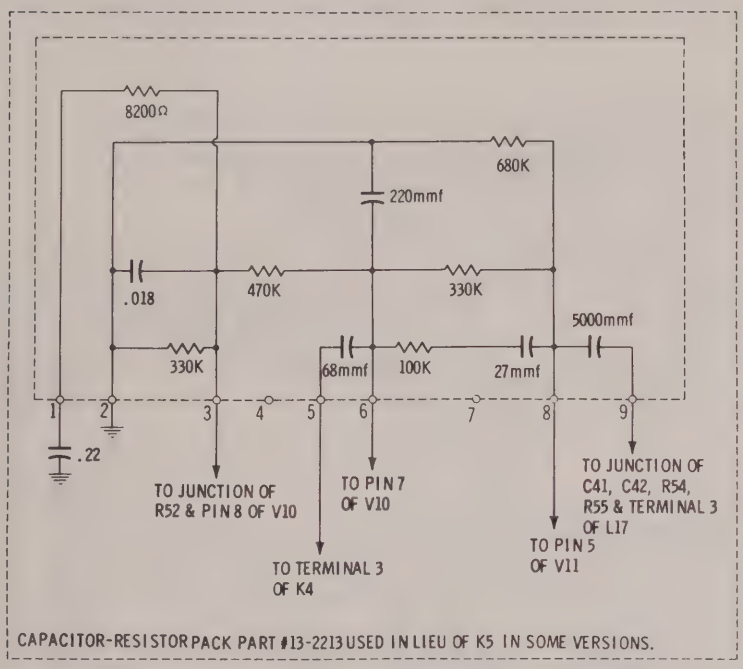
RADIO MODEL 7777 (Ch. 528.53190)





CAPACITOR-RESISTOR PACK PART #13-2213 USED IN LIEU OF K5 IN SOME VERSIONS.

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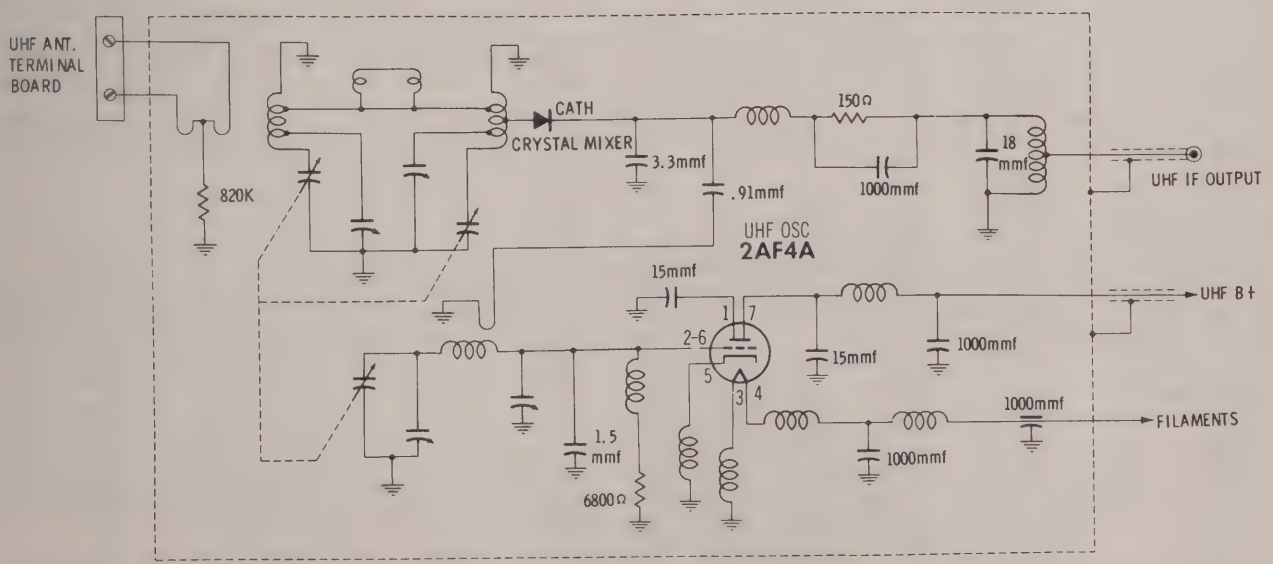
COMPONENT COMBINATION LAYOUT



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UHF TUNER 95-166-0

SET 450 FOLDER 1

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	1st Video IF Amp.	3DJ6	
V2	2nd Video IF Amp.	3DJ6	
V3	3rd Video IF Amp. - Video Det.	3AM6	
V4	Video Output-Sync Sep.	6BH6	5BA8A *
V5	AGC-Keying	3AL6	
V6	Sound IF-Sync Amp	5U8	
V7	Audio Det	3DT6	
V8	Audio Output	3AQ5	
V9	Vert. Mult. - Vert. Output	6CM7	
V10	Horiz. AFC-Horiz. Osc.	6CU7	
V11	Horiz. Output	12DQ6A	
V12	Damper	12M	
V13	HV Rect.	1G3GT	

*Alternate

PICTURE TUBE

ITEM No	REPLACEMENT DATA: SILVERTONE PART No	GENERAL ELECTRIC PART No	RCA PART No	SYLVANIA PART No	NOTES
V14	21CBP4A		21CBP4-A 1	21CBP4	1 Aluminized*
				21CBP4A 2	2 Silver Screen 85
	24AEP4		24AEP4 1	24AFP4 2	

ELECTROLYTIC CAPACITORS

ITEM No	RATING: CAP	RATING: VOLT	SILVERTONE PART No.	AEROVOX PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1	150	150	18-78-5	PRS250V150	BR1505	TC50X	TD-150-150	TVA-1432	
C2A	300	300	18-80-5	AFH4-02-90	D0028	FP418.54	TMQ-118	TVL-4390	
B	20	300							
C	20	300							
D	40	300							
C3A	100	300	18-88-5	PR4-850				TVAB-4587*	Note 1
B	40	300		PRS350V40					
C	40	50							
D	25	25							
C4	20	400	18-77-5	PRS450V20	BR2045	TC75	TD-20-450	TVA-1709	

Note 1. Ch. 456/528.52160, 161, 162, 163, 170, 171, 172, 173, 174, 180, 181, 182, 183, 184, 190, 191, 192, 193, 194 use 25mfd @ 25V, 40mfd @ 50V, 20mfd and 100mfd @ 300V (Part #18-75-5).
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No	RATING: CAP	RATING: VOLT	RATING: TOL	SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	1000			15-102T	BPD-001	DD-103	BYAI0D	B-210	5HK-D	
C6	.047	200		16-47328	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C7	.22	200		16-22428	P288N-22		CUB2P22	GEM-3022	2TM-P22	
C8	5000			15-502T	BPD-005	DD-503	BYAI0D5	B-250	5HK-D5	
C9	.47	100		20-117-1	P288N-47		CUB2P47	GEM-2047	2TM-P47	
C10	1000			20-78-0	BPD-001	DD-103	BYAI0D1	B-210	5HK-D1	
C11	470			20-66-0	BPD-00047	DD-471	BYAI0T47	B-347	5GA-T47	
C12	.47		NPO 5%			TCZ-27	C10Q27C	CNO-427	5TCC-Q27S 5% *	
C13	5000			20-67-0	BPD-005	DD-502	BYAI0D5	B-250	5HK-D5	
C14	680		10%	20-116-0	DZ-680			JL-368	5GA-T68S 10% *	
C15	5000			20-67-0	BPD-005	DD-502	BYAI0D5	B-250	5HK-D5	
C16	470		10%	20-66-0	DI-470	DE-471		JL-347	5GA-T47S 10% *	
C17	10		NPO 10%	20-14-0	NPO-DI 10	DTZ-10	C10Q1C	CNO-410	5TCC-Q1S 10% *	3 4
C18	33		N150							
C19	33		N150							5
C20	1000			20-65-0	BPD-001	DD-102	BYAI0D1	B-210	5HK-D1	
C21	.1	400		20-42-1	P451N-1	DF-104	BC4P1J	ACE401	4SE-P1	
C22	1000			15-102T	BPD-001	DD-102	BYAI0D1	B-210	5HK-D1	
C23	2000			20-69-0	BPD-002	DD-202	BYAI0D2	B-220	5HK-D2	
C24	10000			15-103T	BPD-01	DD-103	BYAI0S1	B-110	5HK-S1	
C25	8.2		N750+1mmf	20-118-0					5TCUB-V82S ± 1mmf *	
C26	.1	600		20-134-1	P451N-1	DF-104	BC8P1J	ACE601	6SE-P10	
C27	.047	600		20-44-1	P488N-047	DF-503	PJ4847	GTM-4147	4TM-S47	
C28	.047	600		20-44-1	P488N-047	DF-503	PJ6847	GTM-6147	6TM-S47	
C29	10000			15-103T	BPD-01	DD-103	BYAI0S1	B-110	5HK-S1	
C30	10000			15-103T	BPD-01	DD-103	BYAI0S1	B-110	5HK-S1	
C31	2000			15-202E	BPD-002	DD-202	BYAI0D2	B-220	5HK-D2	
C32	1000	3000		20-76-0	HVD-30-1000	DD30-102	HVB30D1	3HV-210	30HKD-B1	
C33	.047	600		20-847-1	P688N-047	DF-503	PJ6847	GTM-6147	6TM-S47	
C34	5000			15-502E	BPD-005	DD-502	BYAI0D5	B-250	5HK-D5	
C35	.0068	600		20-97-1	P688N-0068	DD-682	CUB6D68	GEM-6268	6TM-D68	
C36	.01	1000	10%	20-76-1				GEM-1610	10TM-S1	
C37	.1	400		20-42-1	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C38	.056	400		20-118-1					4SE-S568 *	
C39	.22	200		20-43-1	P215N-22		BC2P2J	GEM-3022	2SE-P22	
C40	.375		N750 10%	20-107-0						
C41	.01	800		20-19-1	P688N-01	DD-103	CUB6S	GEM-611	6TM-S1	
C42	1000		5%	20-9-2	1469-001		1R5D8	MCE255	1S-21	
C43	.1	400		20-87-1	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C44	10000			15-103T	BPD-01	DD-103	BYAI0S1	B-110	5HK-S1	
C45	1000			20-65-0	BPD-001	DD-102	BYAI0D1	B-210	5HK-D1	
C46	5000			20-67-0	BPD-005	DD-502	BYAI0D5	B-250	5HK-D5	
C47	5000			20-87-0	BPD-005	DD-502	BYAI0D5	B-250	5HK-D5	
C48	1000			20-65-0	BPD-001	DD-102	BYAI0D1	B-210	5HK-D1	
C49	1000			20-65-0	BPD-001	DD-102	BYAI0D1	B-210	5HK-D1	
C50	1000			20-65-0	BPD-001	DD-102	BYAI0D1	B-210	5HK-D1	
C51	1000			20-65-0	BPD-001	DD-102	BYAI0D1	B-210	5HK-D1	
C52	1000			20-65-0	BPD-001	DD-102	BYAI0D1	B-210	5HK-D1	
C53	1000			20-65-0	BPD-001	DD-102	BYAI0D1	B-210	5HK-D1	
C54	10000	1400		20-122-0	DAC-27	DD-103	HVE25S2	2HV-110	30HKBI-S1	

1 Ch. 456/528.52160, 170, 180, 190 use 1000mmf in this application (Part #20-78-0).
2 Ch. 456/528.52160, 161, 162, 163, 170, 171, 172, 173, 180, 181, 182, 183, 190, 191, 192, 193 use 4. 7mmf NPO 10% in this application (Part #20-23-0).
3 Not used in some versions.
4 Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No	RATING: RESIST Ahce	RATING: WATTS	REPLACEMENT DATA: SILVERTONE PART No	CENTRALAB PART No	CLAROSTAT PART No	IRC PART No.	MALLORY PART No	INSTALLATION NOTES
R1A	1meg		24-333-0	AB-70	A47-1meg-Z	Q1J-137	TA16A	Volume, Note 1
B	Shaft			AK-8	RS-3/16	NQ	DS-37	
R2A	1meg		24-184-8	AB-70	A47-1meg-Z	Q1J-137	TA16A	Tone
B	Shaft			AK-8	RS-3/16	NQ	DS-37	
R3A	200Ω		24-134-1	AB-2		Q1J-201		Contrast
B	Shaft			AK-8		NQ		
R4A	1meg		24-131-1	AB-84	A47-3meg-S	Q1J-140	TA36L	Brightness
B	Shaft			AK-8	RS-3/16	NQ	DS-37	
R5A	1meg		24-134-1	AB-69	A47-1meg-S	Q1J-137	TA16L	Vert. Hold
B	Shaft			AK-8	RS-3/16	NQ	DS-37	
R6A	3meg		24-133-1	AB-84	B47-3meg-S	Q1J-140	PTA355L	Focus, Note 2
B	Shaft			AK-19	Not Req.	TQ	Not Req.	
C	3meg			AB-84	B47-3meg-S	Q1J-140	PTA355L	Local-Distance, Note 3
D	Shaft			AK-19	Not Req.	TQ	Not Req.	
R7A	60K		24-136-1	AB-35		Q1J-125		Horiz. Drive
B	Shaft			AK-19		TQ		
R8	3.4meg		24-140-1					Vert. Height, Note 3
R9	5000Ω		24-267-1					Vert. Lin., Note 4

Note 1. Ch. 456/528.52160, 180 may use 1meg Volume with switch (Part #24-322-0).
Ch. 456/528.52167, 177, 186, 187, 196 use 1meg tapped Volume (Part #24-337-0).
Note 2. Some versions may use 2 single units (Individual Part #24-132-1).
Note 3. Some versions may combine R8, R9 into a dual control (Part #24-141-1). Value may vary in some versions of Ch. 456/528.52163, 173, 174, 183, 192, 194. Replace with original value.
Ch. 456/528.52160, 161, 162, 170, 171, 172, 180, 181, 182, 190, 191, 192 use 7meg Vert. Height with 330K stop (Part #24-268-1).
Note 4. Some versions may combine R8, R9 into a dual control (Part #24-141-1).

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING: OHMS	RATING: WATT	SILVERTONE PART No	NOTES
R10	6.8meg		60-68501	
R11	680K		60-68401	
R12	10K		60-10301	
R13	220K		60-32401	
R14	56K		60-56301	
R15	5600Ω		60-56201	
R16	1000Ω		60-10202	
R17	56Ω		60-56001	
R18	15K		60-15301	
R19	1000Ω		60-10202	
R20	1000Ω		60-10202	
R21	56Ω		60-56001	
R22	56K		60-56301	
R23	1000Ω		60-10202	
R24	220Ω		60-22101	
R25	2100Ω	10	61-143-0	
R26	1000Ω		60-47201	
R27	2200Ω		60-22203	
R28	4700Ω	4	61-5-4	
R29	47K		60-47301	
R30	1.2meg		60-12501	
R31	47K		60-47301	
R32	150K		60-15401	
R33	56K		60-56301	
R34	2200Ω		60-22301	
R35	100Ω		60-22101	
R36	1000Ω		60-10302	
R37	22K	1	60-22311	
R38	680Ω		60-68101	
R39	1000Ω	4	61-28-1	Note 1

ITEM No.	RATING: OHMS	RATING: WATT	SILVERTONE PART No	NOTES
R40	220Ω	1	60-22111	
R41	220K		60-22402	
R42	47K		60-47302	
R43	470K		60-47402	
R44	82000Ω			
R45	33000Ω		60-33201	
R46	680K		60-68401	
R47	100K	1	60-10411	
R48	1.5meg		60-15501	Note 2
R49	2.2meg		60-22502	
R50	18000Ω		60-18201	Note 3
R51	68000Ω		60-68201	Note 4
R52	150K	1	60-15411	
R53	82000Ω			
R54	33K	1	60-33311	
R55	180K		60-18401	
R56	56000Ω	2	60-56221	
R57	33Ω	1	60-33011	Note 5
R58	1000Ω	1	60-10211	Note 5
R59	560Ω			
R60	560Ω			Note 5
R61	100Ω	7	61-140-0	
R62	2500Ω	10	61-128-0	
R63	560Ω	1		Note 6
R64	100Ω	7	61-140-0	
R65	2500Ω	10	61-128-0	
R66	4.5Ω	10	61-115-0	
R67	5Ω	25	61-118-0	
R68	27K		60-27301	Note 7
R69	4.7meg		60-47502	

Note 1. Ch. 456/528.52160, 161, 162, 163, 170, 171, 172, 173, 174, 180, 181, 182, 183, 184, 190, 191, 192, 193, 194 use 1800Ω 4W in this application (Part #61-4-1).
Note 2. Not used in Ch. 456/528.52161, 162, 170, 171, 172, 180, 181, 182, 190, 191, 192. Some versions may use different value. Replace with original value.
Note 3. Ch. 456/528.52160, 161, 162, 163, 166, 170, 171, 172, 173, 174, 180, 181, 182, 183, 184, 186, 190, 191, 192, 193, 194 use 10000Ω in this application (Part #60-10202).
Note 4. Not used in Ch. 456/528.52160, 161, 162, 163, 166, 170, 171, 172, 173, 174, 180, 181, 182, 183, 184, 186, 190, 191, 192, 193, 194.
Note 5. Values may vary. Replace with original value.
Note 6. Some versions may use 4700 1W in this application (Part #60-47112).
Note 7. Ch. 456/528.52161, 170, 171, 180, 181, 190, 191 use 18000 10W 5% in this application. (Part #61-135-0).

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA: SILVERTONE PART No.	Gromer PART No.	Meissner PART No	Merit PART No.	Miller PART No.	Ram PART No	NOTES
L1A	1st Video IF	10-25-3						
B	41.25MC Trap							
L2A	2nd Video IF	10-21-3						
B	47.25MC Trap							
L3	3rd Video IF	10-22-3						
L4	4th Video IF	10-24-3						
L5	RF Choke	10-15-1						
L6	Resonant Choke	10-85-1						12uh
L7	Series Peaking Coil	10-84-1			TV-183	6110		60uh
L8	Series Peaking Coil	10-86-1	19-3250 *	19-3250 *	TV-198 *	6130 *	VP-6 *	270uh 1 ①
L9	Shunt Peaking Coil	10-88-1	19-3250	19-3250	TV-198	6130	VP-6	270uh ②
L10	1st Sound IF	10-152-1						
L11	2nd Sound IF	10-23-3						
L12	Quadrature Coil	10-17-5						
L13	RF Choke	10-138-1	19-1002	19-1002	SW-530	4606		2.65uh
L14	FIL. Choke	10-123-1	19-1002	19-1002	BC-583	4606		2.2uh
L15	Line Choke	10-149-1	19-3036	19-3036	TV-180	6178	VP-1	40uh
L16	Line Choke	10-149-1	19-3036	19-3036	TV-180	6178	VP-1	40uh

† Wound on 15K resistor.
* Parallel with 15K resistor.
① Some versions may use 270uh (Alternate Part #10-150-1).
② Some versions may use 270uh (Alternate Part #10-147-1).

TRANSFORMER (HORIZ. OSC.)

ITEM No	DC RES: PRI.	DC RES: SEC.	REPLACEMENT DATA: SILVERTONE PART No.	Halldorson PART No	Merit PART No.	Miller PART No.	Ram PART No	Thordarson PART No	NOTES
LJ7	72Ω		10-13-5						Horiz. Freq. tapped @ 55Ω Horiz. Waveform 44Ω

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA: SILVERTONE PART No	Halldorson PART No	Merit PART No	Ram PART No	Rogers PART No	Stancor PART No	Thordarson PART No	Triad PART No
T1	Vert. Output	B80-1-3C		A-2824 ①	V315 ①		VO-101 ②		A-112X 1
	Alt. Vert. Output	B80-1-3		A-2824 ①	V315 ①		VO-101 ②		A-112X 1
T2	Yoke-Horiz. (20MH)	D80-5-4C	Y-18	MDF-92	Y90F19/43	PCM2045	DY-18A	Y-16	Y-41 4
	(90°)-Vert. (41MH)	③ ④	③ ④	③ ④	③ ④	③ ④	③ ④	③ 4	NW1 4
	Alt. Yoke	80-5-4	Y-18	MDF-92	Y90F19/43	PCM2045	DY-18A	Y-16	Y-41 4
		③ ④	③ ④	③ ④	③ ④	③ ④	③ ④	③ 4	NW1 4
	Rear Cover & Centering Device	83-936							YU-1 4
	Alt. Rear Cover & Centering Device	83-1034							CL-1
	Yoke Clamp	22-2-3							YC-1 4
	Alt. Yoke Clamp	22-115-3							CL-1
T3	Horiz. Output	D80-9-3D							
	Alt. Horiz. Output	80-9-3							

1 Cut and tape blanking lead.
2 Drill new mounting hole(s).
3 Use original yoke damping network, if necessary.
4 Use original rear cover, centering device and yoke clamp. Connect yoke terminal #3 to yoke plug pin #7, yoke terminals #2 and #7 to yoke plug #2, yoke #1 to plug #5, jumper from yoke terminal #1 to yoke #6. Connect yoke terminal #4 to plug #3.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE: PRI	IMPEDANCE: SEC	REPLACEMENT DATA: SILVERTONE PART No	Halldorson PART No	Merit PART No	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No	NOTES
T4	5500Ω	3-4Ω	80-80-1	24S51	A-2930	AL-601	A-3877	24S51	S-3X	

SPEAKER

ITEM No	TYPE: SIZE	TYPE: FIELD	TYPE: V C IMP	REPLACEMENT DATA: SILVERTONE PART No	QUAM PART No	NOTES
SP1	6 x 9"	PM	3-4Ω	53-359-4 1	69A3	1 Used in all models except PC-9194, 5, 6, 7, 9194, 5, 6, 7
SP2	3 x 4"	Electrostatic		84-6276		2 Models PC-9194, 5, 6, 7, PC-9194, 5, 6, 7
SP3	3 x 4"	Electrostatic		84-6276		
SP4	3" x 4"	Electrostatic		84-6276		
SP5	3 x 4"	Electrostatic		84-6276		
	12"	PM	8-8Ω	53-262-4 2	12A6PA	

COMPONENT COMBINATIONS

ITEM No	USE	DESCRIPTION	SILVERTONE PART No	REPLACEMENT DATA
K1	Sound IF Screen	5000mmf, 68K	13-21-3 1	Sprague PRC-6
K2	Audio Detector	100mmf, 3000mmf, 10000, 220K, 470K, 560K	13-25-3 2	Sprague HN-6
K3	Sync Separator	150mmf, 5000mmf, 5000mmf, 47K, 68K, 90K, 270K, 2.2meg	13-24-3	Sprague ST-16
K4	Vert. Circuit	2000mmf, 4000mmf, 9000mmf, 9600mmf, 12K, 22K, 22K, 56K, 58K, 33K	13-23-3	
K5	Horiz. Osc.	27mmf, 68mmf, 220mmf, 5000mmf, 8000mmf, 8000mmf, 8200Ω, 100K, 330K, 330K, 470K, 680K	13-25-3 3	

1 Some versions may use individual components in this application.
2 Ch. 456/528.52160, 161, 162, 170, 171, 172, 180, 181, 182, 190, 191, 192 use 330mmf, 5000mmf, 10000, 220K, 470K, 560K with same part number.
3 Some versions may use alternate part #13-22-3).

RECTIFIERS

ITEM No	RATING: CURRENT (Measured)	SILVERTONE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No	NOTES
M1	.305A	86-3-3 1	1241AH 1	T350 1	35vA 1		1 Selenium Type.
M2	.305A	86-3-3 1	1241AH 1	T350 1	35vA 1		

MISCELLANEOUS

ITEM No	PART NAME	SILVERTONE PART No	NOTES
M3	Tuner	95-165-0	VHF Ch. 456/528.52160 Series, 180 Series
	Tuner	95-169-0	VHF with UHF provisions, Ch. 456/528.52170 Series, 190 Series
	Tuner	95-166-0	UHF Ch. 456/528.52170 Series, 190 Series
M4	Switch	69-280-0	Off-On (TV)
M5	Switch	69-250-0	Power Tuning (TV)
M6	Switch	84-6782	Channel Selector (Motor Stop), Models 9160 to 9163
	Switch	84-6783	Channel Selector (Motor Stop), Models 9164 to 9169, 9194 to 9197
M7	Switch	69-254-0	Off-On (Remote)
M8	Switch	69-253-0	Tuning (Remote)

SILVERTONE CHASSIS 456.52160, 161, 162, 163, 166, 167, 170, 171, 172, 173, 174, 180, 181, 182, 183, 184, 186, 187, 190, 191, 192, 193, 194, 528.52160, 161, 162, 163, 166, 167, 170, 171, 172, 173, 174, 180, 181, 182, 183, 184, 186, 187, 190, 191, 192, 193, 194, 528.53190, 191, 528.59200

FOLDER 1

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS (cont)

ITEM No.	PART NAME	PART No.	NOTES
M9	Switch	69-286-0	TV-Phono Ch. 456/528.52166, 167, 186, 187
	Switch	69-209-0	TV-Phono Ch. 456/528.52160, 161, 162, 163, 170, 171, 172, 173, 174, 180, 181, 182, 183, 184, 190, 191, 192, 193, 194
M10	Circuit Breaker	43-1-2	
	Circuit Breaker	43-3-2	Alternate
M11	Motor	59-136	Includes Motor Run Switch
M12	Width Sleeve	83-1052	
	Magnet	27-66-2	Beam Alignment used in some versions
	Printed Board	84-7578	Sweep (Without Tubes) Ch. 456/528.52167, 187
	Printed Board	84-6942	Sweep (Without Tubes) Ch. 456/528.52160, 161, 162, 170, 171, 172, 180, 181, 182, 190, 191, 192
	Printed Board	84-7205	Sweep (Without Tubes) Ch. 456/528.52163, 166, 173, 174, 183, 184, 186, 193, 194
	Printed Board	84-7275	IF, Sync, Sound (Without Tubes) Ch. 456/528.52166, 167, 174, 184, 186, 187, 194
	Printed Board	84-7075	IF, Sync, Sound (Without Tubes) Ch. 456/528.52160, 161, 162, 163, 170, 171, 172, 173, 180, 181, 182, 183, 190, 191, 192, 193

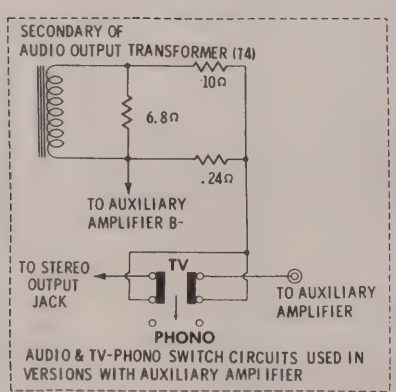
CABINETS & CABINET PARTS

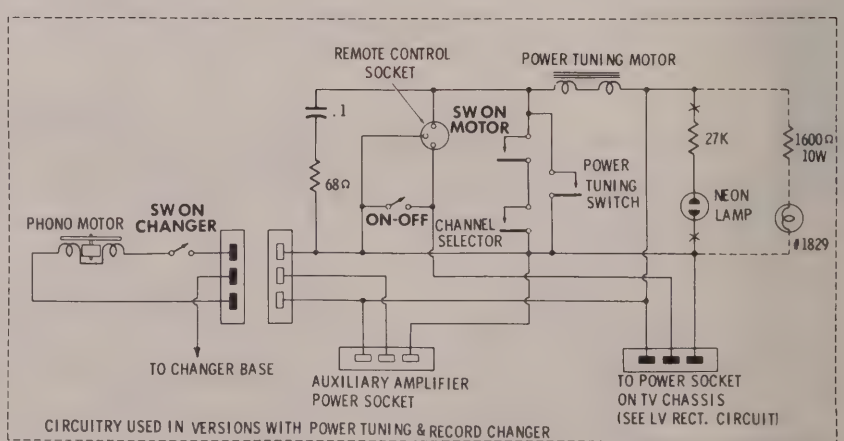
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Mask	40-10-4	21" Models
Mask	40-11-4	24" Models
Safety Glass	48-143-0	21" Models
Safety Glass	48-142-0	24" Models
Knob	52-1107-0	Touch Bar, VHF Channel Selector
Knob	52-924-0	UHF Channel Selector, Models PC-9161, PC-9163, PC-1985A, PC-9187A, PC-9188.5A, PC-9189.5A, 9161, 9163, 9185A, 9187A, 9188.5A, 9189.5A
Knob	52-925-0	UHF Channel Selector, Models PC-9195, PC-9197, 9195, 9197
Knob	52-926-0	UHF Fine Tuning
Knob	52-1097-0	Control & VHF Fine Tuning
Knob	52-1108-0	Off-On
Cabinet	42-81-0	Models PC-9160, PC-9161, 9160, 9161
Cabinet	42-82-0	Models PC-1962, PC-1963, 9162, 9163
Cabinet	42-87-0	Models PC-1984A, PC-9185A, 9184A, 9185A
Cabinet	42-88-0	Models PC-9186A, PC-9187A, 9186A, 9187A
Cabinet	42-89-0	Models PC-9188A, PC-9188.5A, 9188A, 9188.5A
Cabinet	42-107-0	Models PC-9189A, PC-9189.5A, 9189A, 9189.5A
Cabinet	42-96-0	Models PC-9194, PC-9195, 9194, 9195
Cabinet	42-97-0	Models PC-9196, PC-9197, 9196, 9197
Leg	49-359	Models PC-9160, PC-9161, 9160, 9161
Leg	49-360	Models PC-9162, PC-9163, 9162, 9163
Leg	49-366	Models PC-9184, PC-9185, 9184, 9185
Leg	49-367	Models PC-9186A, PC-9187A, 9186A, 9187A
Leg	49-368	Models PC-9188A, PC-9188.5A, 9188A, 9188.5A
Leg	49-409	Models PC-9189A, PC-9189.5A, 9189A, 9189.5A
Leg	49-380	Models PC-9194, PC-9195, 9194, 9195
Leg	49-381	Models PC-9196, PC-9197, 9196, 9197

WIRING DATA

High Voltage Lead	Use BELDEN No.	8869
Shielded Hook-up Wire	Use BELDEN No.	8885 (Single Conductor)
		8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors
		8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No.	8874
300Ω Tuner Input Lead	Use BELDEN No.	8225
300Ω Antenna Lead-in	Use BELDEN No.	8230 or 8275
Antenna Rotor Cable	Use BELDEN No.	8464 (Flat) or 8484 (Round) - 4 Conductor
		8485 (Round) - 5 Conductor
		8488 (Round) - 8 Conductor





A PHOTOFACT STANDARD NOTATION SCHEMATIC

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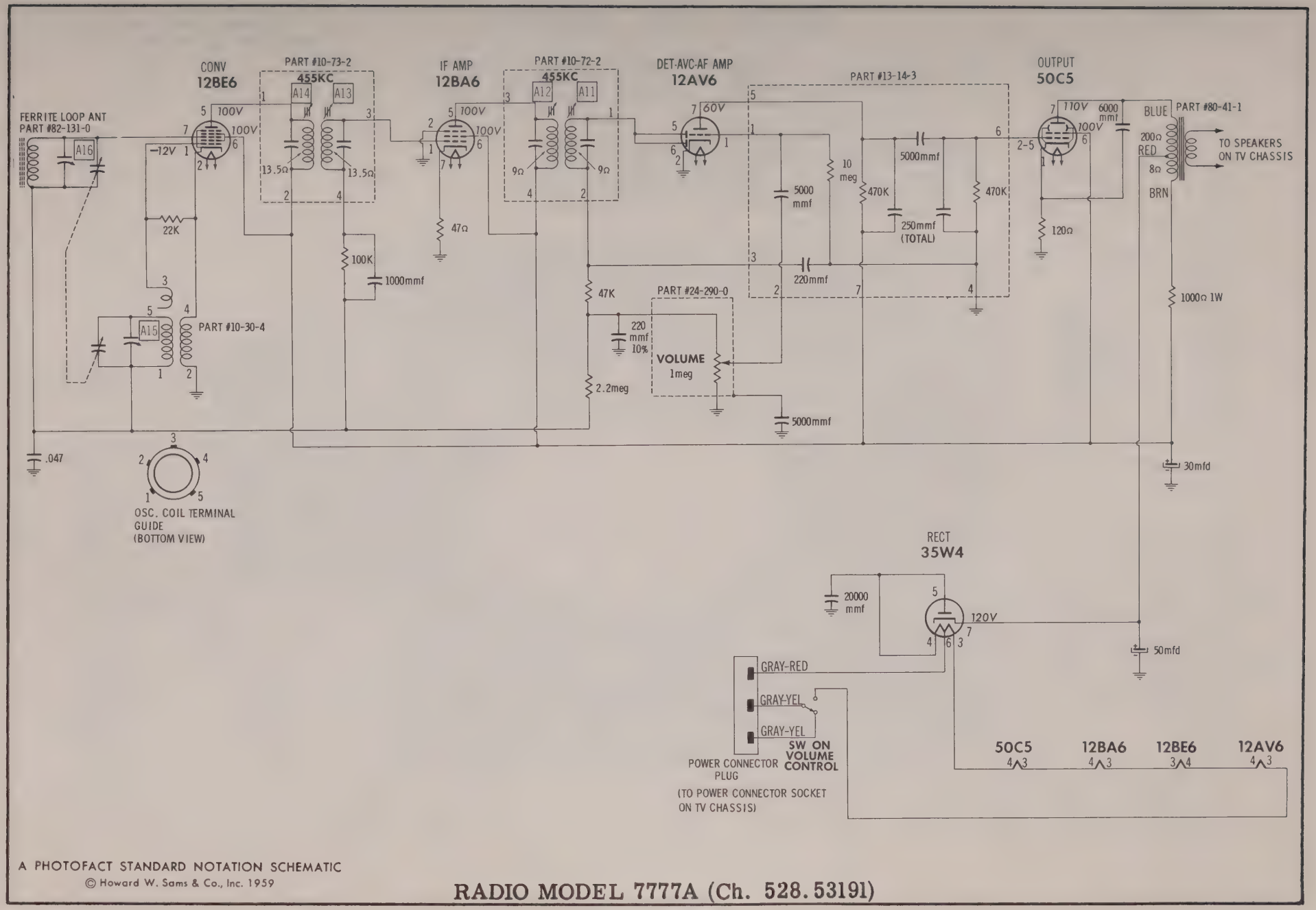
ALTERNATE CIRCUITS



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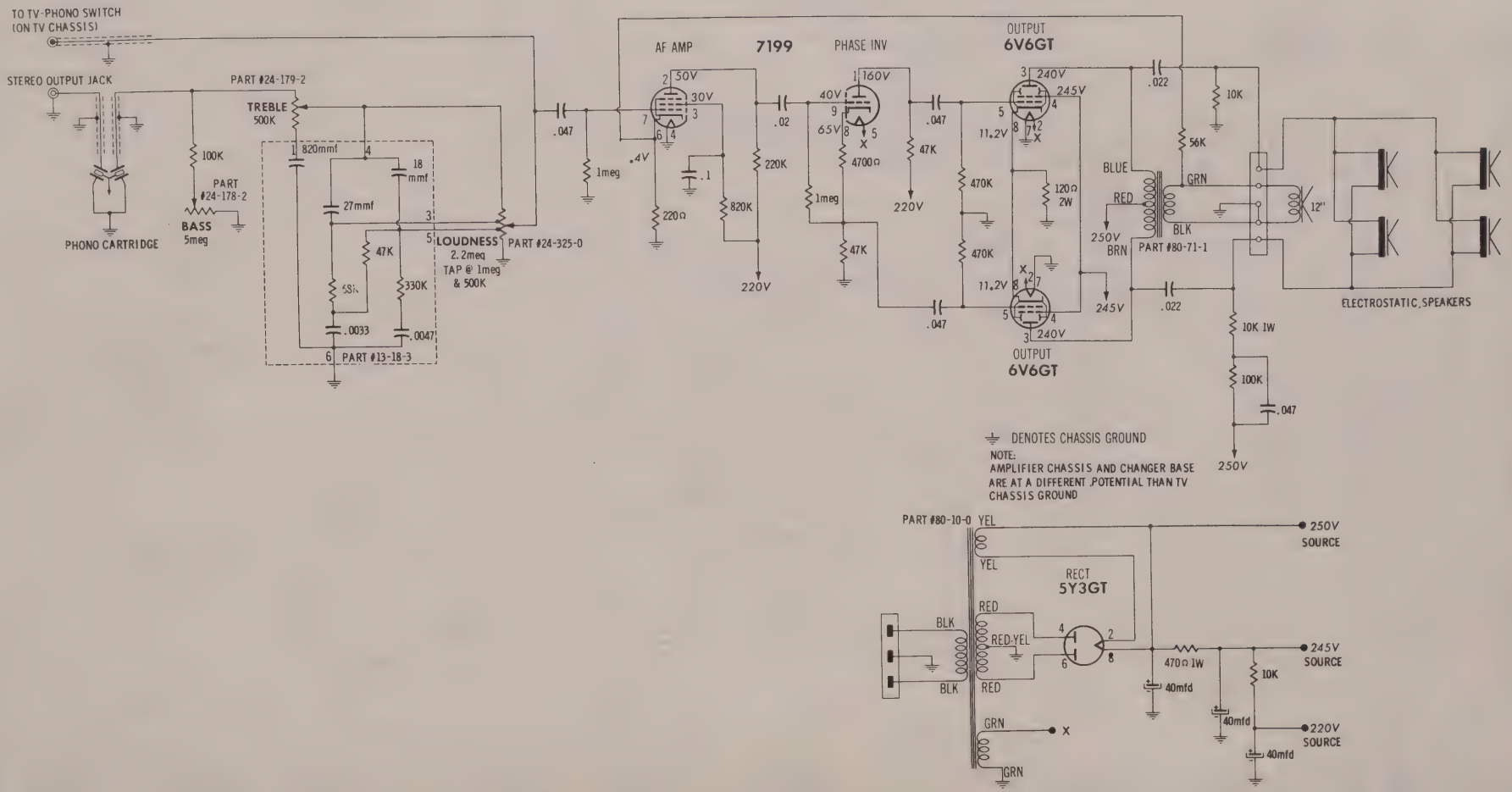
RADIO MODEL 7777A (Ch. 528.53191)



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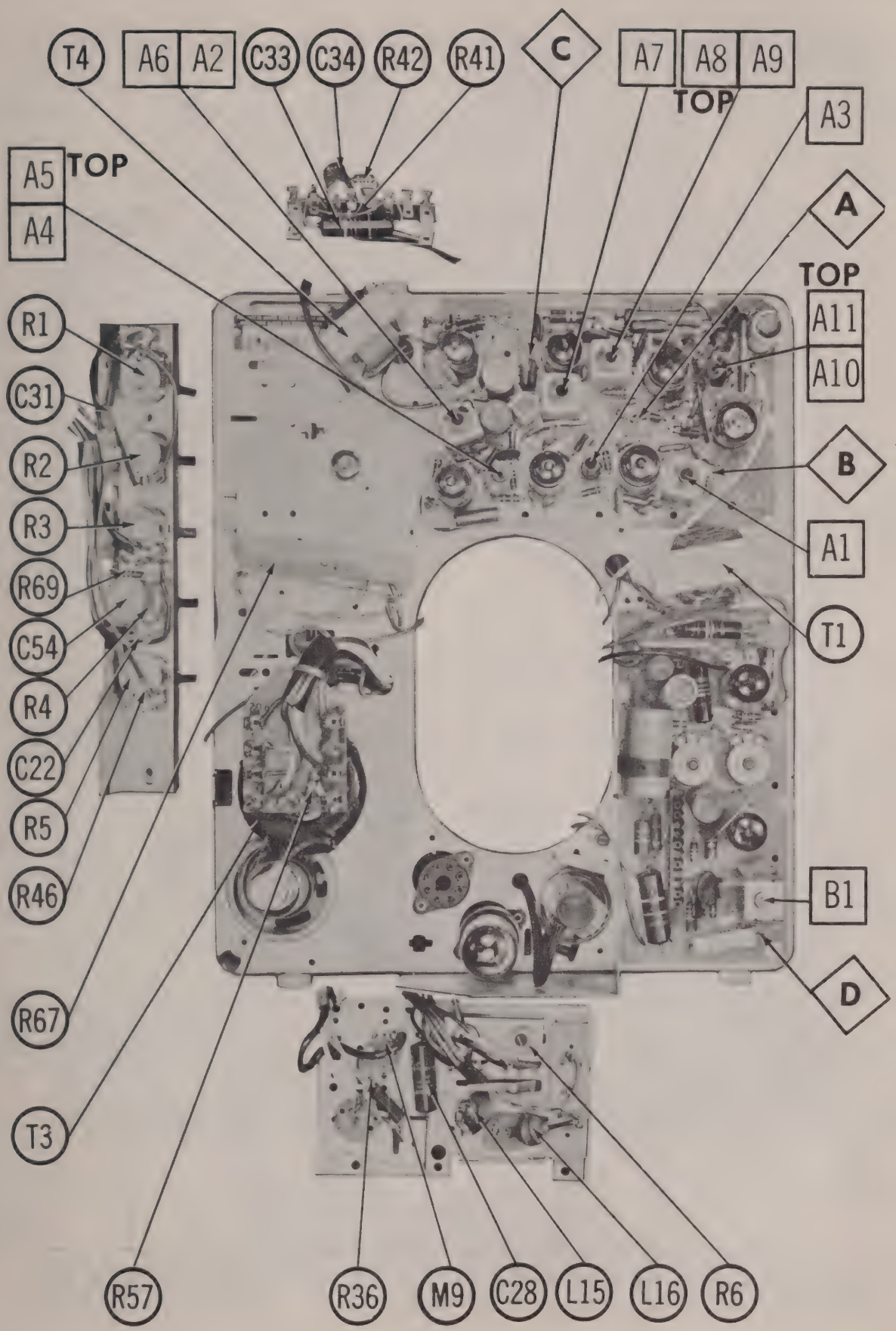
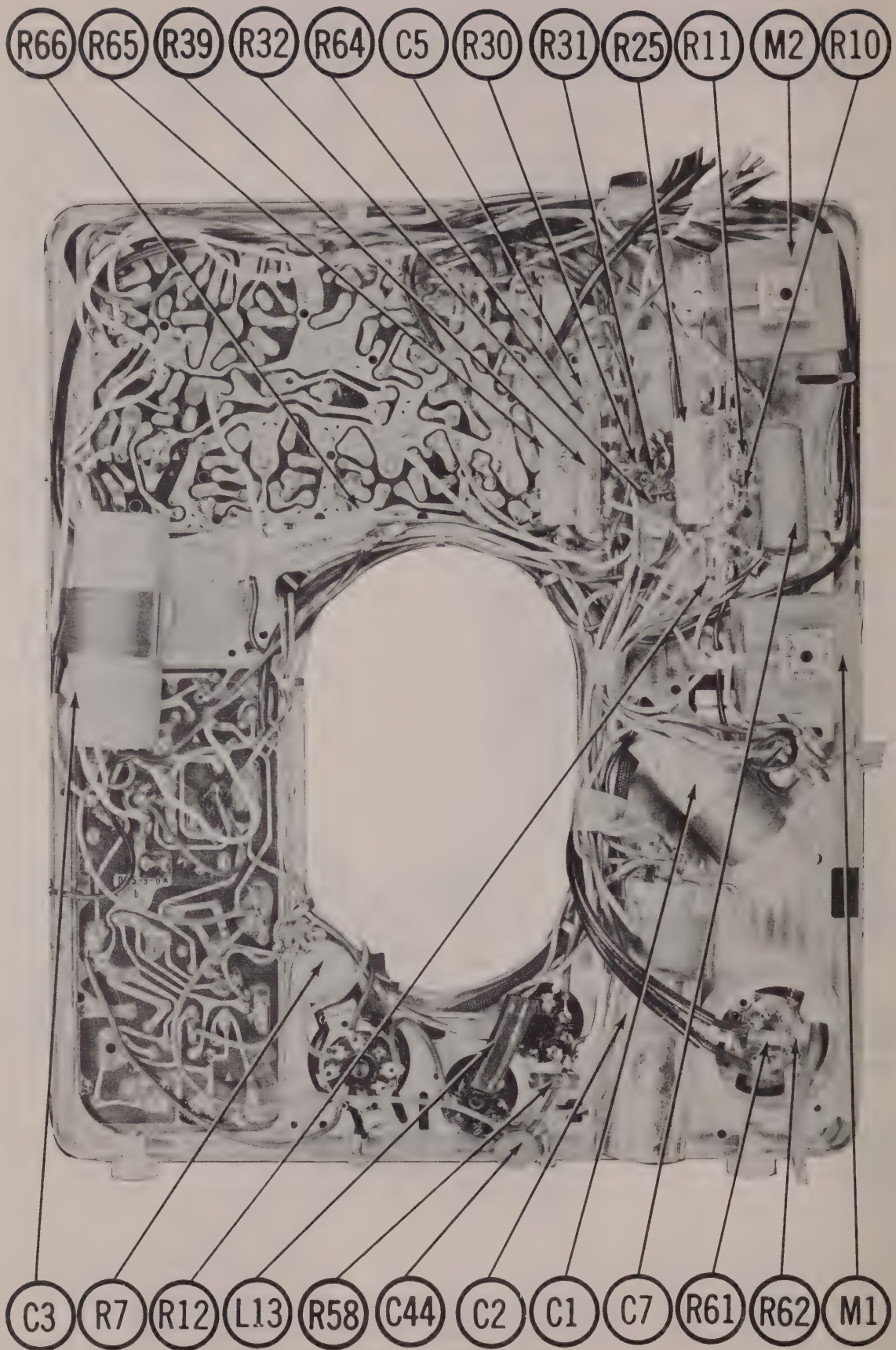
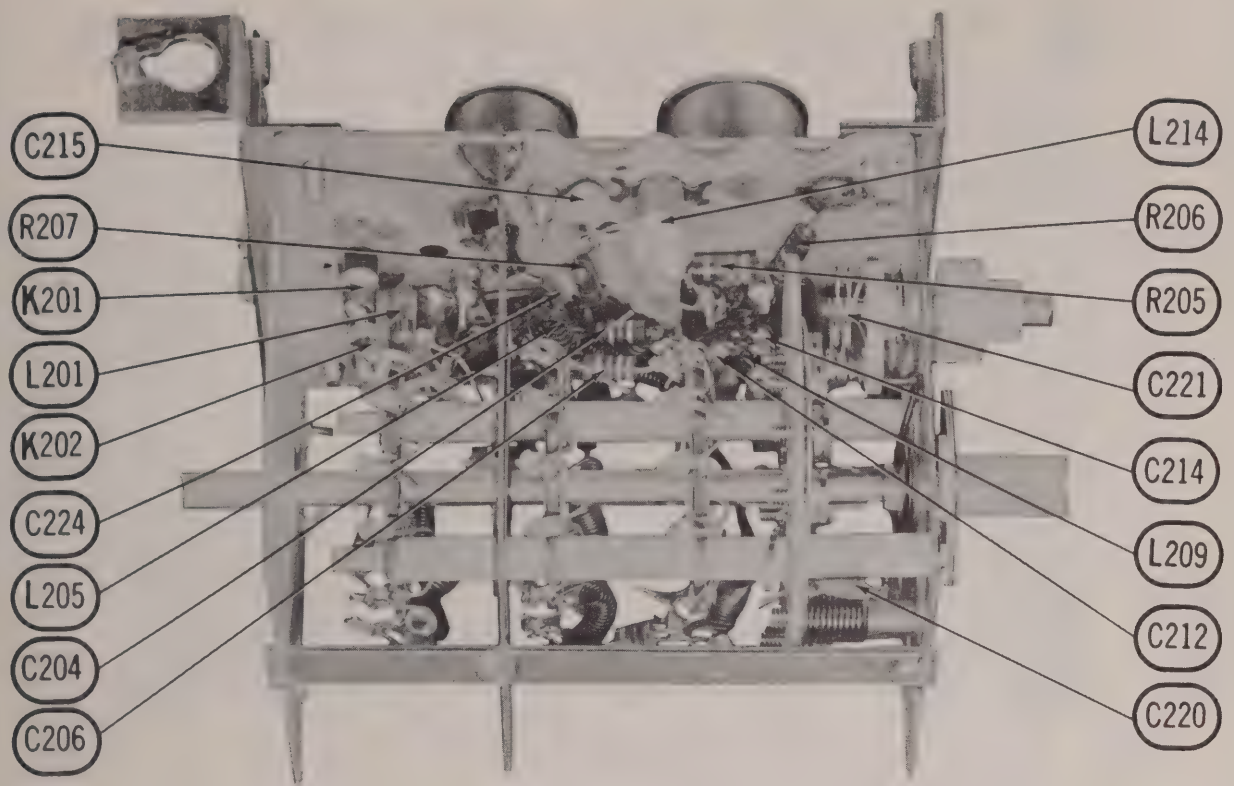
AMPLIFIER CHASSIS 528.59200



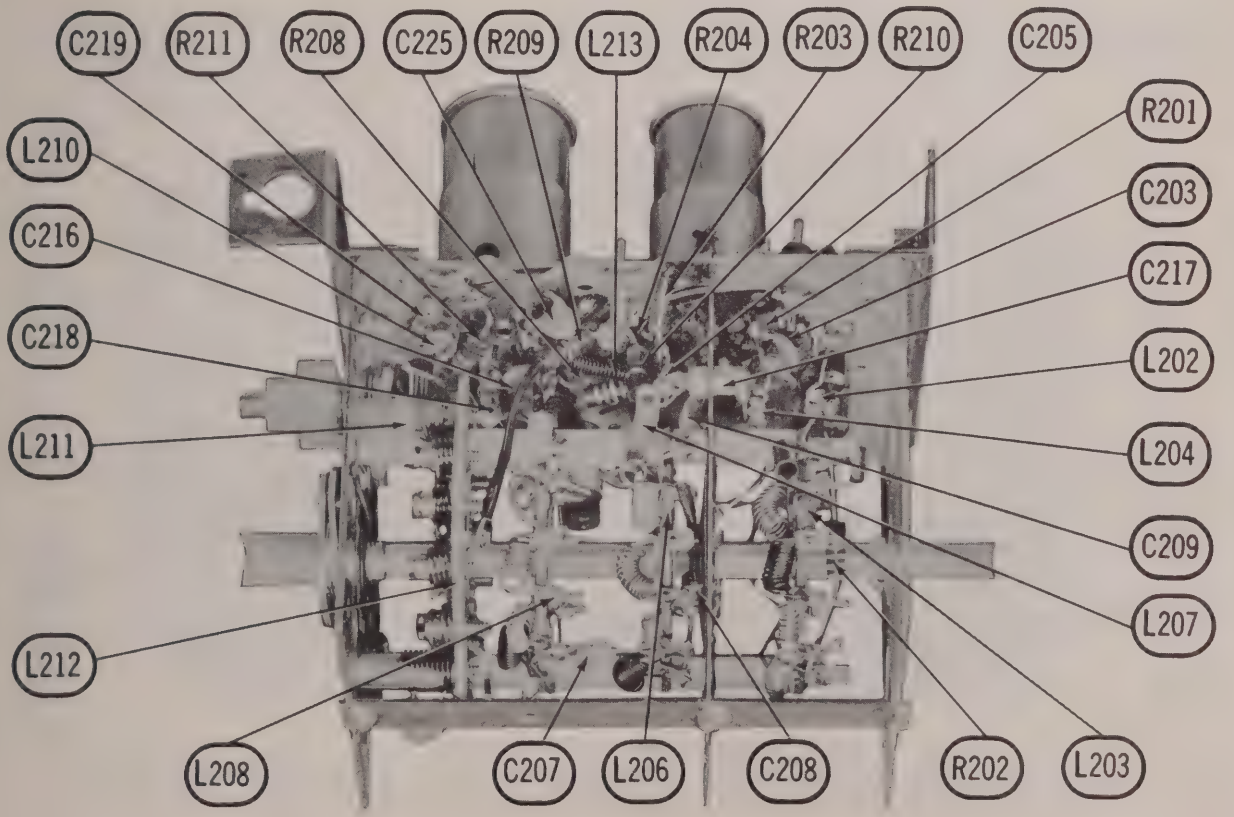
CHASSIS TOP VIEW



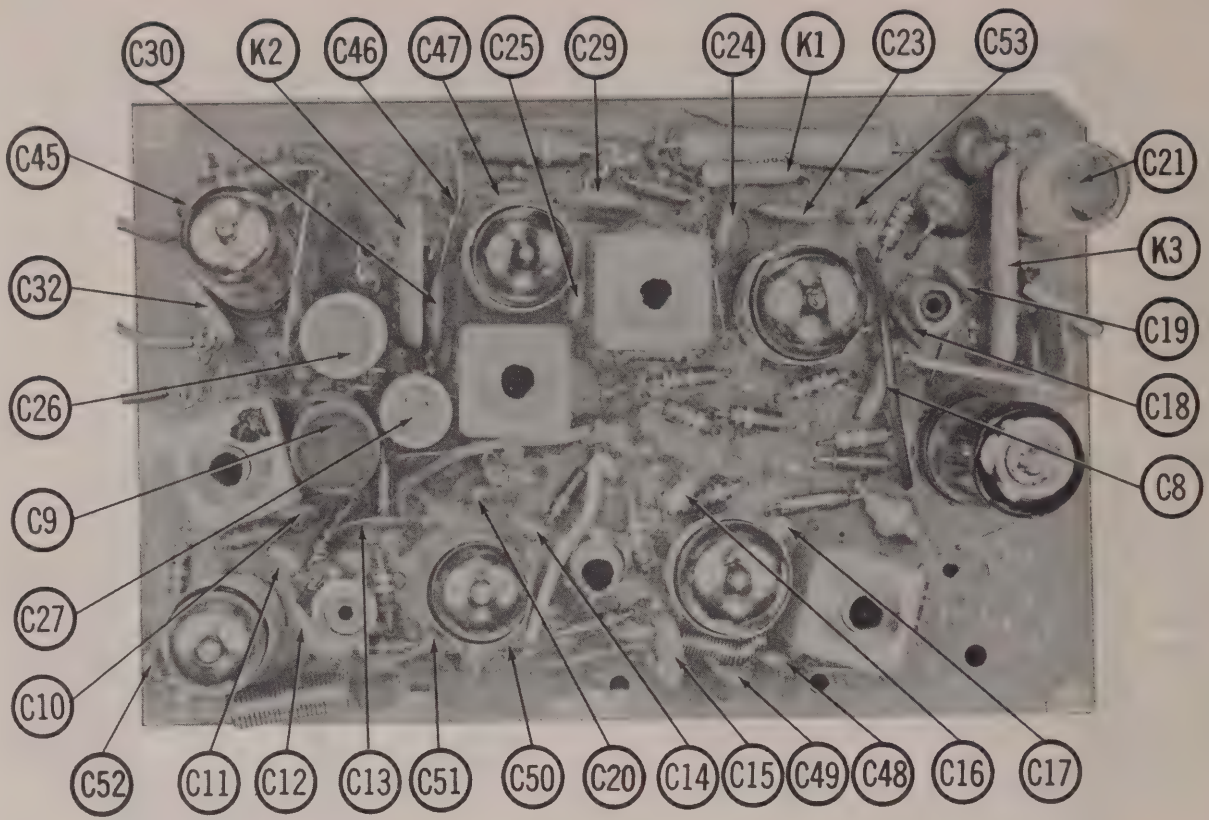
CHASSIS BOTTOM VIEW



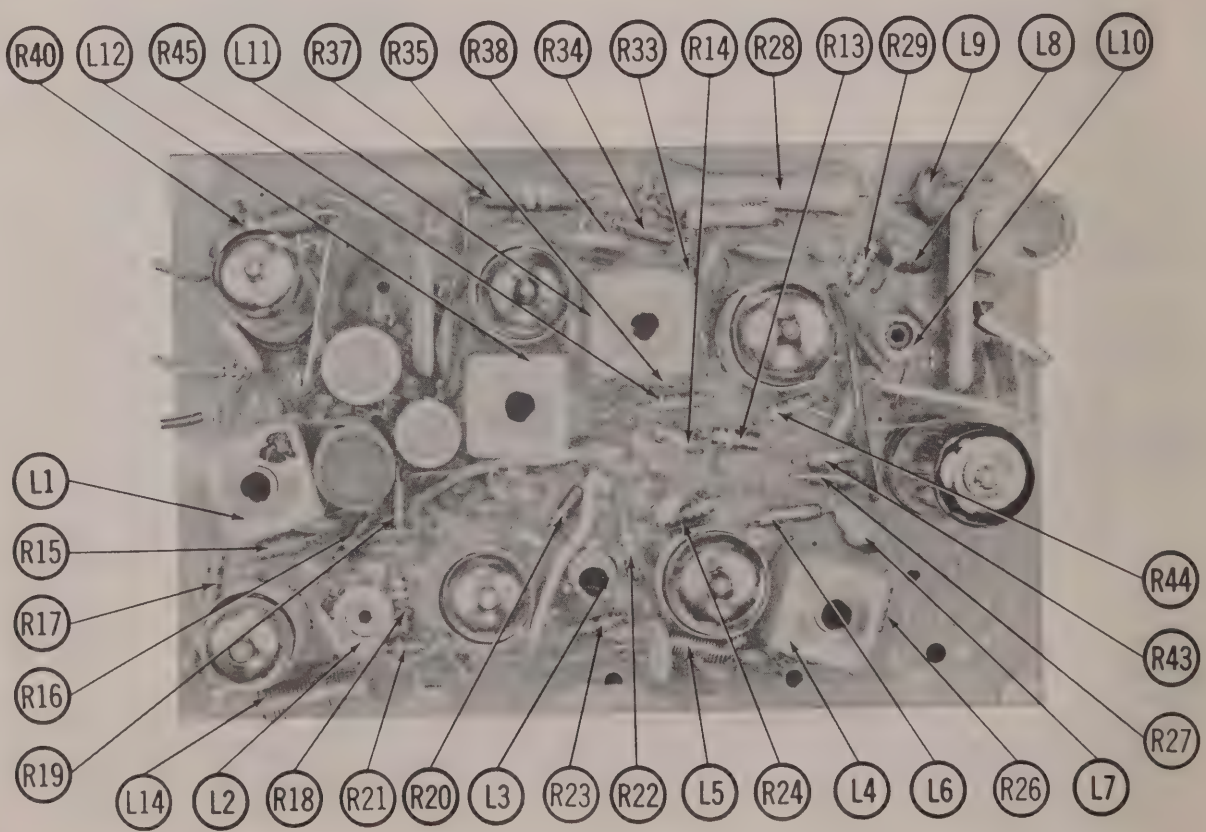
TUNER 95-165-0 LEFT SIDE



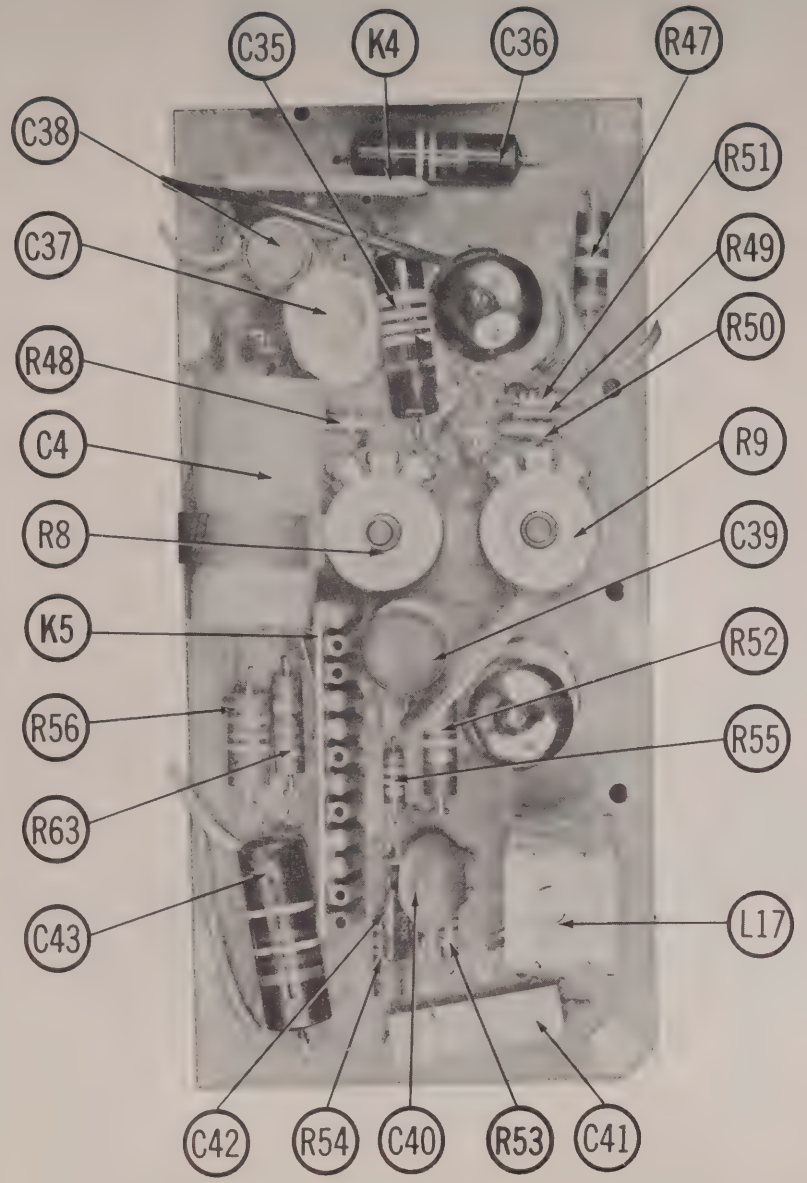
TUNER 95-165-0 RIGHT SIDE



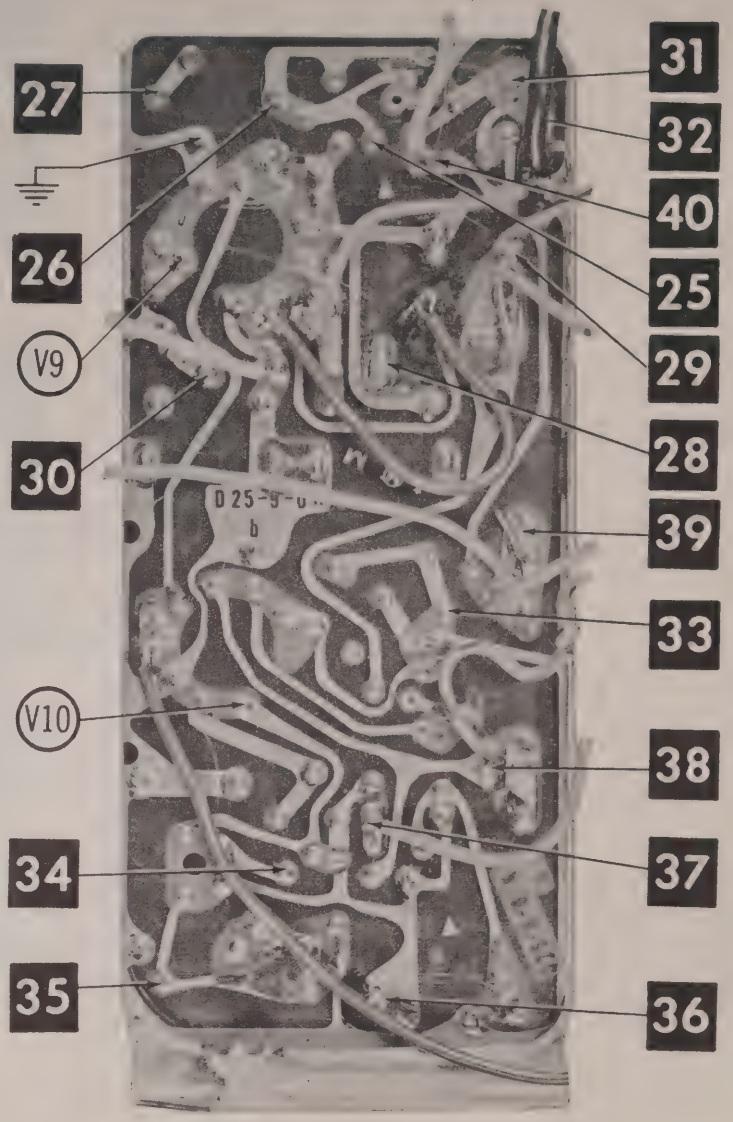
IF, SYNC & SOUND PRINTED BOARD CAPACITOR IDENTIFICATION



IF, SYNC & SOUND PRINTED BOARD - R & L IDENTIFICATION



SWEEP PRINTED BOARD



A Howard W. Sams CIRCUITRACE* Photo

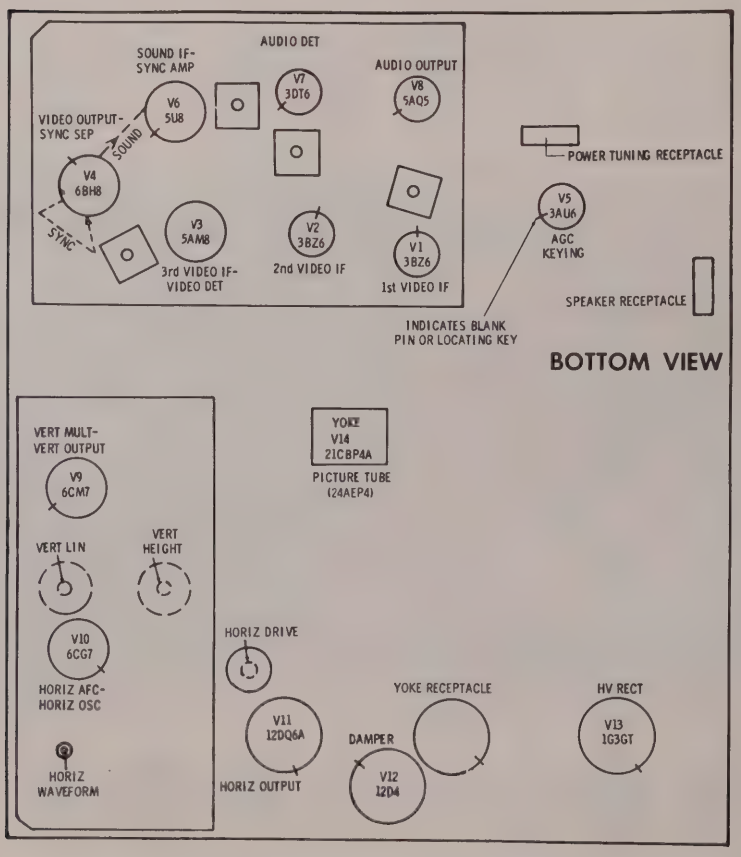
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3BZ6	62K	56Ω	2Ω	2.5Ω	†3100Ω	†3100Ω	0Ω		
V2	3BZ6	57K	56Ω	2.5Ω	3Ω	†3100Ω	†3100Ω	0Ω		
V3	5AM8	220Ω	.1Ω	†3500Ω	3Ω	4.5Ω	†3500Ω	.1Ω	4700Ω	0Ω
V4	6BH8A	0Ω	2.2meg	†470K	6Ω	4.5Ω	● 75Ω	4700Ω	†4700Ω	†5400Ω
V5	3AU6	†52K	†660Ω	8.5Ω	9Ω	275K	†47K	†660Ω		
V6	5U8	†11K	4Ω	†70K	6Ω	7Ω	†4700Ω	220Ω	3300Ω	†470K
V7	3DT6	5.2Ω	680Ω	7Ω	7.5Ω	†690K	†22K	560K		
V8	5AQ5	0Ω	220Ω	7.5Ω	8.5Ω	†1300Ω	†1000Ω	0Ω		
V9	6CM7	†2000Ω	NC	0Ω	12Ω	10.5Ω	● †2.3meg	● 1.1meg	2.2meg	● 2700Ω
V10	6CG7	● †45K	450K	0Ω	12Ω	13.5Ω	†660Ω	480K	280K	NC
V11	12DQ6A	NC	13.5Ω	TP	†5700Ω	450K	NC	17Ω	0Ω	TOP CAP †42Ω
V12	12D4	NC	NC	¶ 100K	NC	†100Ω	NC	20Ω	17Ω	
V13	1G3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP †520Ω
V14	21CBP4A	10.5Ω	68K	Pin 6 ● †800K	Pin 10 †15Ω	Pin 11 ● 550K	Pin 12 9Ω			
V201	2CY5	1meg	0Ω	2Ω	1.5Ω	†4000Ω	†13K	0Ω		
V202	5CL8	15K	†20K	0Ω	1.5Ω	0Ω	†4700Ω	†30K	0Ω	225K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 260V SOURCE.
† MEASURED FROM PIN 3 OF V12.

NC NO CONNECTION.
TP TIE POINT.



TUBE PLACEMENT CHART

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL MODEL 9160A (Ch. 528.52167)

1. Remove 8 push-on type knobs from front.
2. Remove 10 wood screws holding rear cover. Remove rear cover.
3. Remove picture tube socket, yoke plug, power tuning plug, electrostatic speaker plug, speaker leads, HV lead, 2 picture tube ground straps, and 2 rear control panel ground straps.
4. Remove 3 metal screws holding rear control panel.
5. Remove 3 metal screws holding front control escutcheon. Remove escutcheon.
6. Remove 4 metal screws holding On-Off switch and Power Tuning switch.
7. Remove 2 hex nuts inside front holding control bracket. Remove control bracket.
8. Remove 3 wood screws holding tuner mounting bracket at top rear. Remove tuner.
9. Remove 2 top and 2 bottom chassis bolts.
10. Remove chassis.

SERVICING IN THE FIELD

SAFETY GLASS REMOVAL

Remove 5 screws holding the trim strip at the top edge of the safety glass. Tilt glass out and remove.

FUSE DEVICE

A Circuit Breaker is used for low voltage power supply protection, and may be reset by depressing the reset button. (For location, see "Tube Placement Chart".)

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of the VHF Oscillator, it is necessary to remove the rear cover. The adjustments are located in a circle around the tuning shaft at the front of the tuner.

AGC

The AGC may be varied by means of a Local-Distance control. (For location, see "Tube Placement Chart".)

FOCUS

The focus may be varied by means of a Focus control. (For location, see "Tube Placement Chart".)

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

The Horizontal Frequency slug is used for the Horizontal Hold. (For location, see "Tube Placement Chart".)

WIDTH

The width may be varied by adjusting a metallic sleeve, located between the yoke and the picture tube neck, in or out of the yoke.

HORIZONTAL DRIVE

The horizontal drive may be varied by a Horizontal Drive control. (For location, see "Tube Placement Chart".)

CENTERING

Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Tune in a TV station and adjust the Horizontal Hold until the picture synchronizes horizontally. If the picture cannot be synced with the Horizontal Hold, turn the Waveform slug (B1) several turns out of the coil form from its original position. Readjust the Horizontal Hold until the picture synchronizes horizontally.

Connect the vertical amplifier of the scope thru a low capacity probe to point Ⓓ. Connect low side to chassis. Retouch the Horizontal Hold to synchronize the picture.

Adjust the Waveform slug (B1) for a waveform similar to Fig. 2 with the sharp peak approximately 10% higher than the broad peak. Keep the picture in sync during this adjustment with the Horizontal Hold. Remove scope connection and retouch Horizontal Hold, if necessary to synchronize picture horizontally.

Adjust the Horizontal Drive clockwise until drive lines appear. Turn counterclockwise until drive lines or horizontal compression near the center of the picture disappears.

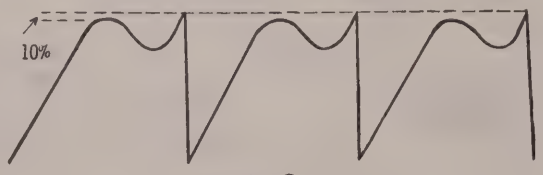


FIG. 2

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

WESTINGHOUSE CHASSIS V-2374-1, V-2374-2

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

WESTINGHOUSE CHASSIS
V-2374-1, V-2374-2

MODEL H-21T263 (Ch. V-2374-1)

WESTINGHOUSE CHASSIS
V-2374-1, V-2374-2

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

WESTINGHOUSE CHASSIS V-2374-1, V-2374-2

WESTINGHOUSE CHASSIS V-2374-1, V-2374-2

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL MODEL H-21T263

1. Remove 3 push-on type knobs from the front.
2. Remove 3 metal screws holding escutcheon. Remove the escutcheon. Remove 4 push-on type knobs now visible.
3. Remove 4 metal screws holding front control panel.
4. Remove 8 metal screws holding rear cover. Remove the rear cover.
5. Remove 1 metal screw holding antenna bracket. Remove speaker leads.
6. Remove 6 hex head bolts holding chassis. Remove the chassis.

MODEL H-21T263 (Ch. V-2374-1)

CAUTION

ONE SIDE OF AC LINE CONNECTED TO CHASSIS.

Care should be exercised when connecting test equipment or physically contacting chassis. Isolation devices employed by manufacturer should be checked and properly connected before returning receiver to owner.

TRADE NAME	Westinghouse	MODELS	CHASSIS
		H-21K270, H-21K271, H-21T262, H-21T263, H-21T264, H-21T265, H-21T266, H-21T267, H-21T268, H-21T269, H-21T270, H-21T271	V-2374-1
		H-21KU270, H-21KU271, H-21TU262, H-21TU263, H-21TU264, H-21TU265, H-21TU266, H-21TU267, H-21TU268, H-21TU269	V-2374-2
MANUFACTURER	Westinghouse Electric Corp., Television & Radio Div., Metuchen, N.J.		
TYPE SET	Television Receiver		
TUBES	VHF-Sixteen, UHF-Seventeen		
POWER SUPPLY	105-120 Volts AC, 60 Cycle	RATING 110 Watts, 1.15 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

WESTINGHOUSE CHASSIS V-2374-1, V-2374-2

SERVICING IN THE FIELD

SAFETY GLASS REMOVAL

Remove 3 screws holding the trim strip at the top edge of the safety glass. Tilt glass out and remove.

FUSE DEVICE

A 7.5Ω fusible resistor (R80) is used for low voltage power supply protection. (For location, see "Tube Placement Chart".)

TUNER OSCILLATOR ADJUSTMENTS

To touch-up the VHF Oscillator remove the Channel Selector and Fine Tuning knobs or remove the rear cover and adjust thru a hole in the right side of the tuner rear cover, depending upon tuner used.

AGC

No provision is made to vary the AGC on this receiver.

FOCUS

No provision is made to vary the focus on this receiver.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

Coarse adjustment of the Horizontal Hold is accomplished by the proper setting of the Horizontal Multivibrator Trimmer and Horizontal Frequency slug. (For location, see "Tube Placement Chart".)

CENTERING

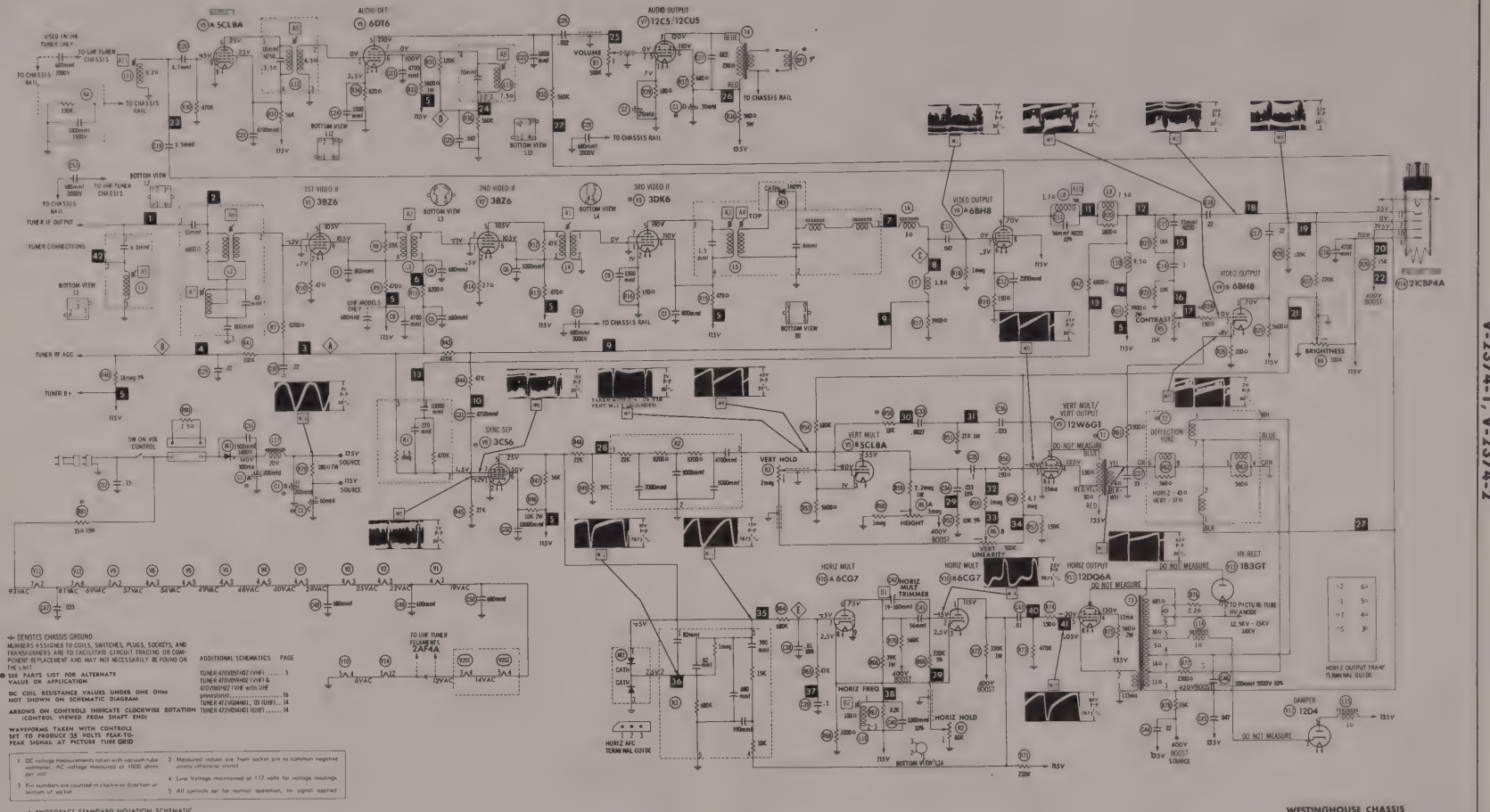
Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

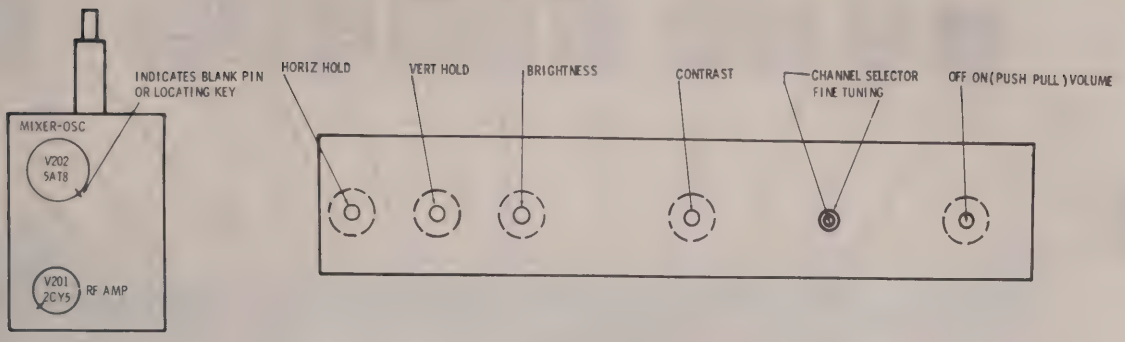
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

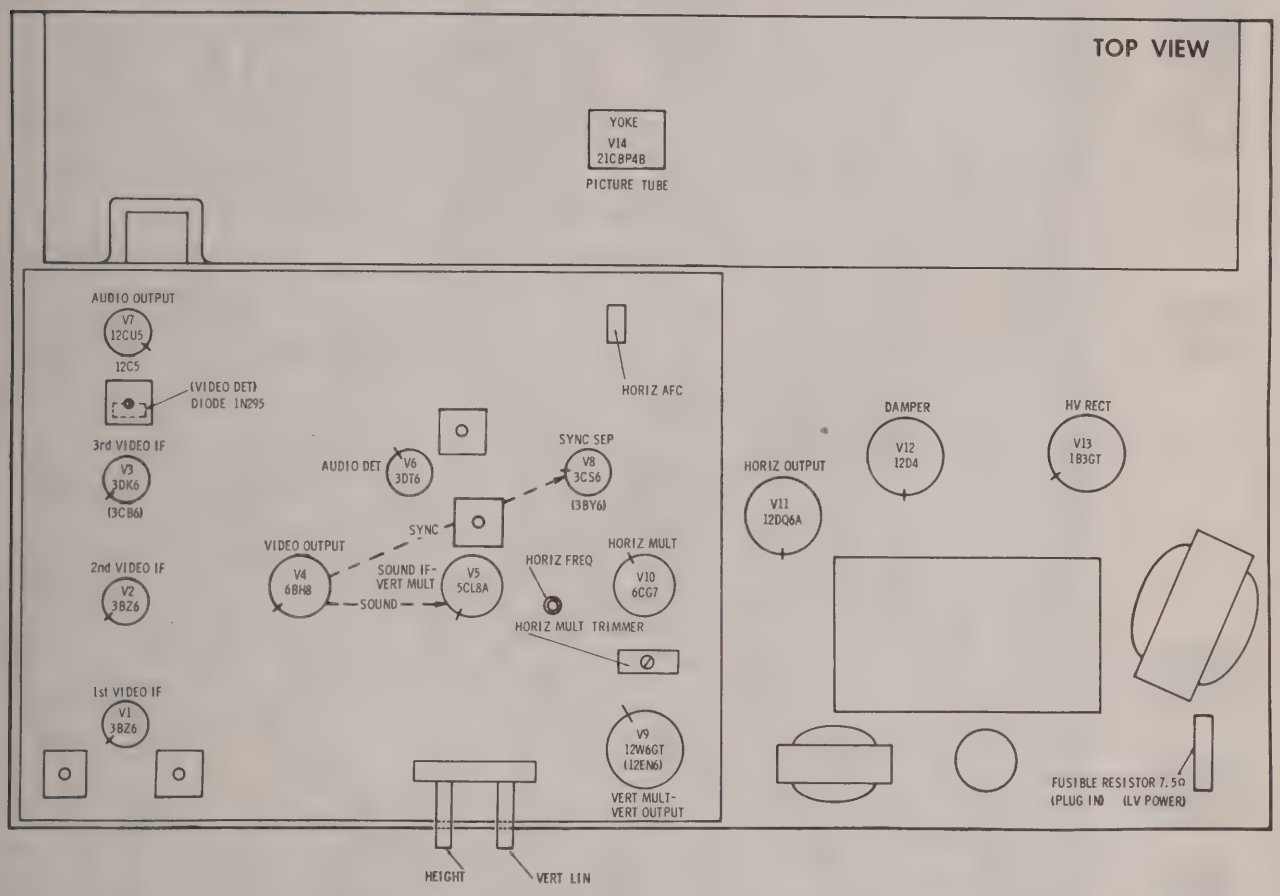
JA348

SET 450 FOLDER 2


WESTINGHOUSE CHASSIS
V-2374-1, V-2374-2
DENOTES CHASSIS GROUND
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 35 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE GRID
ADDITIONAL SCHEMATICS PAGE
1 DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1000 ohms per volt
2 Pin numbers are counted in clockwise direction on bottom of socket
3 Measured values are from socket pin to common negative unless otherwise stated
4 Line Voltage maintained at 117 volts for voltage readings
5 All controls set for normal operation, no signal applied
A PHOTOFACT STANDARD NOTATION SCHEMATIC
CIRCUIT DIAGRAM
© Howard W. Sams & Co. Inc. 1959
WESTINGHOUSE CHASSIS
V-2374-1, V-2374-2

TUBE PLACEMENT CHART





TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

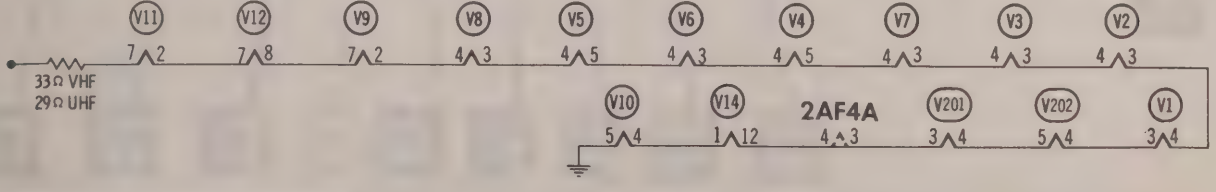
POWER SUPPLY FAILURE
No raster, no sound Fusible Resistor (7.5Ω), Rect. (B+)

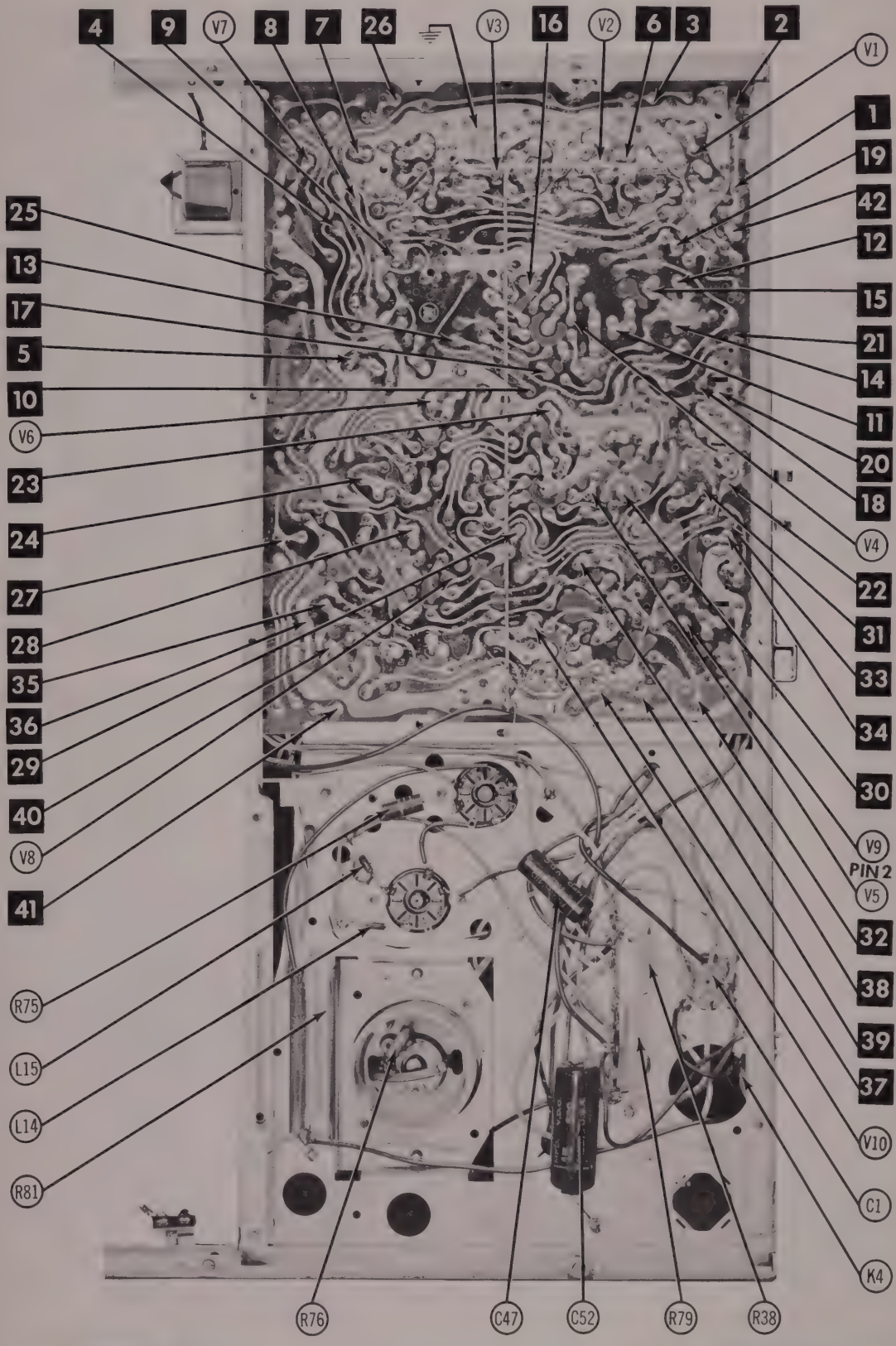
SWEEP FAILURE
No raster, has sound Rect. (Horiz. AFC), V10, V11, V12, V13, V14, Rect. (B+)
No vertical deflection V5, V9
Poor vert. linearity or foldover V5, V9
Poor horiz. linearity or foldover V10, V11, V12
Narrow picture Rect. (B+), V10, V11, V12
Vert. off freq. V5, V9
Horiz. off freq. Rect. (Horiz. AFC), V10

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, V4, Diode (Video Det.)
No pic, no sound, has snow V201, V202
No pic, has sound, has raster V4, V14
Has pic, no sound V5, V6, V7

SYNC FAILURE
No vert. sync V8
No horiz. sync V8, Rect. (Horiz. AFC)
No vert. or horiz. sync V8

This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)

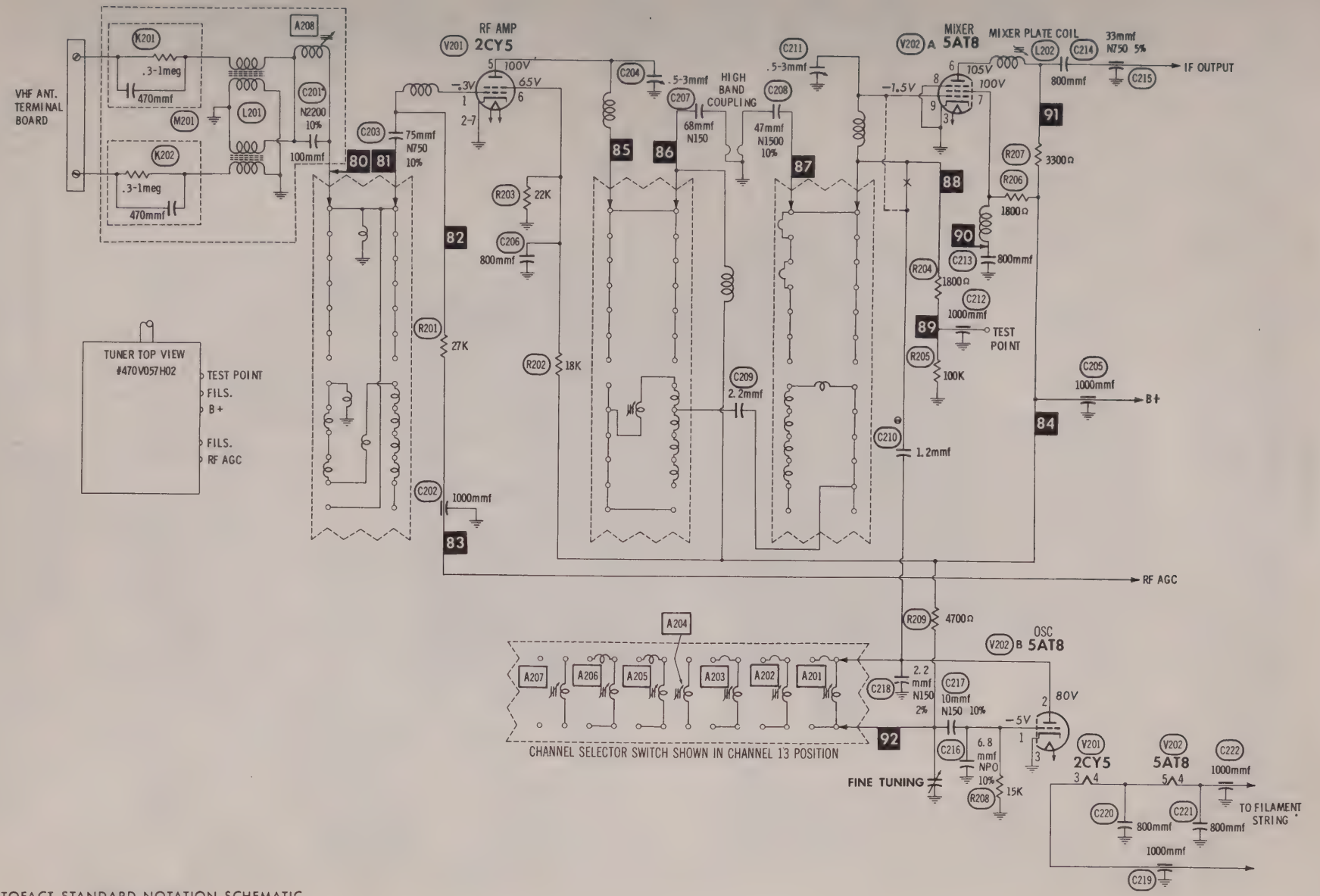




CHASSIS BOTTOM VIEW

WESTINGHOUSE CHASSIS
V-2374-1, V-2374-2

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



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VHF TUNER 470V057H02

WESTINGHOUSE CHASSIS V-2374-1, V-2374-2

TUNER PARTS LIST AND DESCRIPTIONS

470V057H02

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	2CY5	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	5AT8	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	100		N2200 19%	690V013H10 †						
C202	1000			690V013H14	EF-001	MFT-1000			503C-D1	
C203	75		N1500	V-8747						
C204	.5-3			690V013H56		829-3				
C205	1000			690V013H14	EF-001	MFT-1000			503C-D1	
C206	800			690V013H13	BPD-0008	DD-801	L10T8	B-382	5GA-T8	
C207	68		10%	215V126A80	DI-68	DD-680	L10Q68	CNO-468	5GA-Q68S 10%*	
C208	47		10%	690V004H26	DI-47	DD-470	L10Q47	CNO-447	5GA-Q47S 10% *	
C209	2.2		10%	215V300H09	NPO-SI 2.2	TCZ-2R2	C10V22C	CNO-522	5TCCB-V22S10%*	
C210	1.2		10%						5TCCB-V12S10%*	①
C211	.5-3			690V013H57		829-3				
C212	1000			690V013H14	EF-001	MFT-1000			503C-D1	
C213	800			690V013H13	BPD-0008	DD-801	L10T8	B-382	5GA-T8	
C214	800			690V013H13	BPD-0008	DD-801	L10T8	B-382	5GA-T8	
C215	33		N750 10%	690V013H01				CN7-433	5TCU-Q33S 5%	
C216	6.8		NPO 10%	690V013H21	NPO-DI 6.8	DTZ-6R8	C10V68C	CNO-568	5TCCB-V68S10%*	
C217	10		N150 5%	690V013H09						
C218	2.2		N3300 10%	V-19013-1						
C219	1000			690V013H14	EF-001	MFT-1000			503C-D1	
C220	800			690V013H13	BPD-0008	DD-801	L10T8	B-382	5GA-T8	
C221	800			690V013H13	BPD-0008	DD-801	L10T8	B-382	5GA-T8	
C222	1000			690V913H14	EF-001	MFT-1000			503C-D1	

† Part of M201.
① Some versions may use .68mmf 10% in this application (Part #690V013H53).
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		Westinghouse PART No.	NOTES
	OHMS	WATT		
R201	27K		RC20AE273K	
R202	18K		RC20AE183K	
R203	22K		RC20AE223K	
R204	1800Ω		RC20AE182K	
R205	100K		250V221A04	

ITEM No.	RATING		Westinghouse PART No.	NOTES
	OHMS	WATT		
R206	1800Ω		RC20AE182K	
R207	3300Ω		RC20AE332K	
R208	15K		RC20AE153J	
R209	4700Ω		250V224A72	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Westinghouse PART No.	REPLACEMENT DATA	
K201	Antenna Isolation	470mmf, .3-1meg	†	Centralab Sprague	RC-471 AC1-1
K202	Antenna Isolation	470mmf, .3-1meg	†	Centralab Sprague	RC-471 AC1-1

† Part of M201.

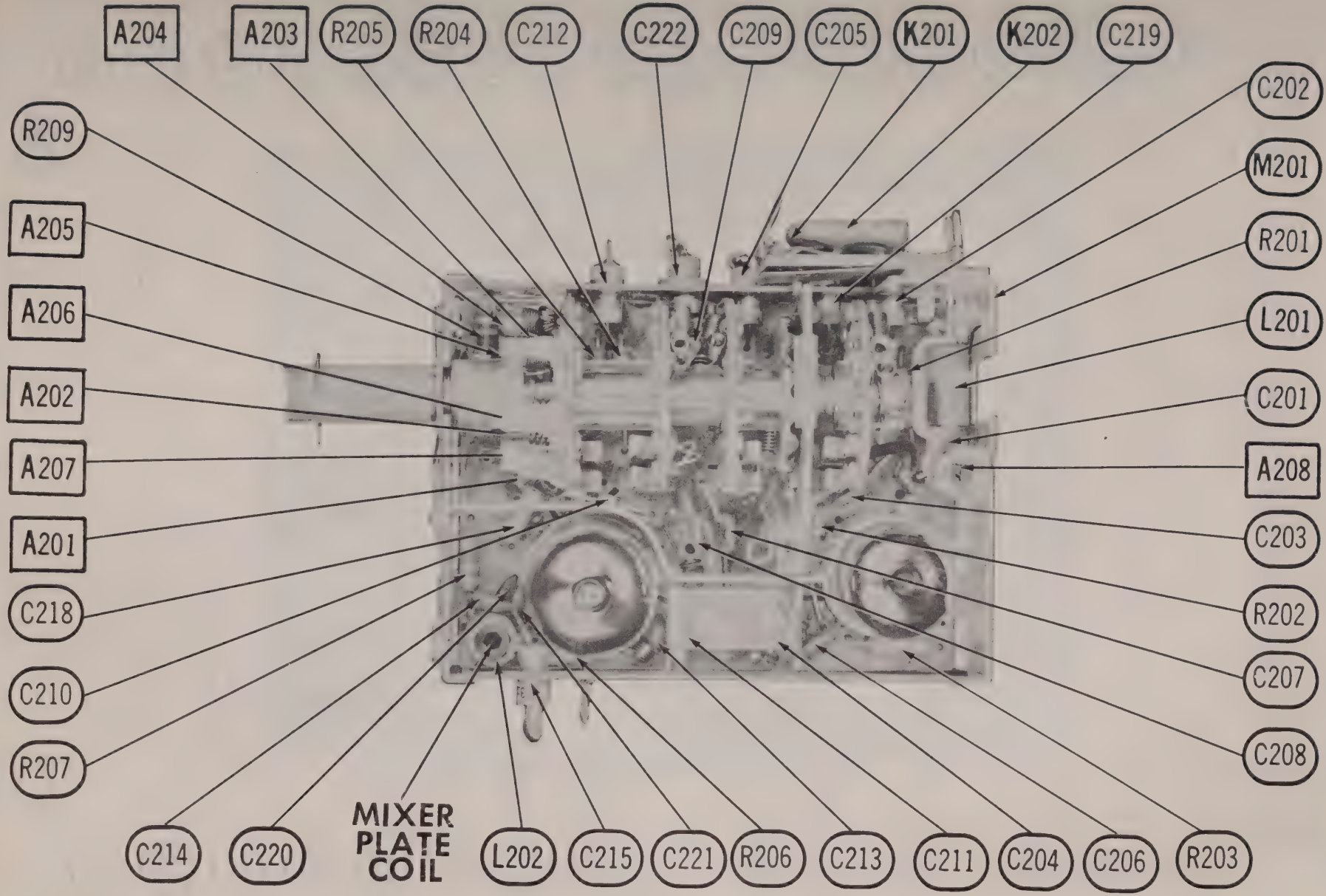
COILS (RF-IF)

ITEM No.	USE	Westinghouse PART No.	NOTES
L201A	Ant. Trans.	†	† Part of M201.
B	IF Trap Coil	†	† Part of M201.

ITEM No.	USE	Westinghouse PART No.	NOTES
L202	Mixer Plate	690V013H58	

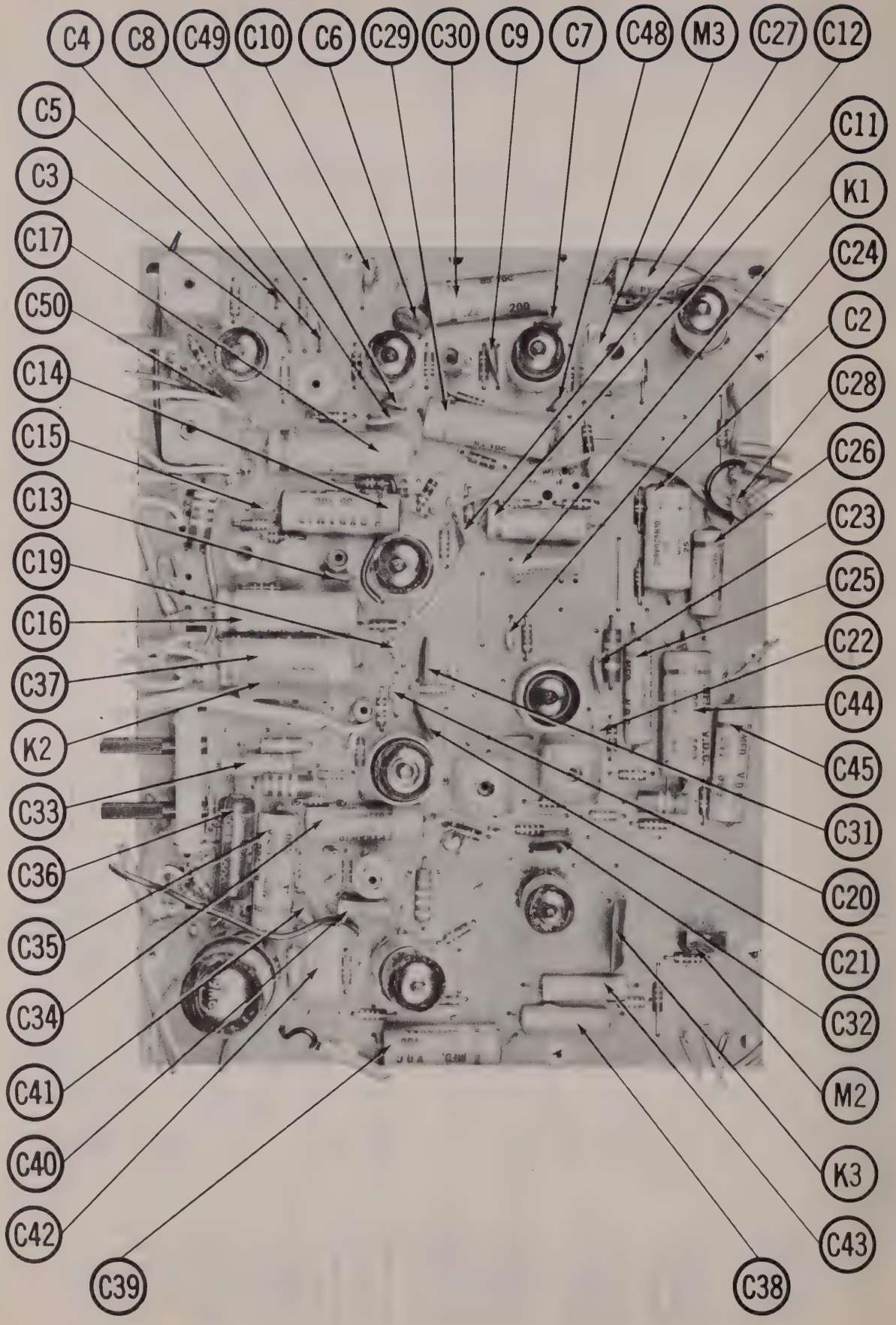
MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
M201	Antenna Input	690V013H59	Inclues rear plate, C201, L201, K201, K202



TUNER 470V057H02 - TOP VIEW

WESTINGHOUSE CHASSIS
V-2374-1, V-2374-2



PRINTED BOARD - CAPACITOR IDENTIFICATION

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Use an ISOLATION TRANSFORMER TO PROTECT the Test Equipment.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

VIDEO IF ALIGNMENT

Connect the negative lead of a 4 volt bias supply to point (A). Positive to chassis.
Connect the negative lead of a 2.5 volt bias supply to point (B). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough generator output to provide a usable indication on VTVM.
Detune A4, A6, and A7.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001mfd	High side to pin 1 (grid) of 1st Video IF. Low side to chassis.	Not used	45.25MC	Any non-interfering channel	USE VTVM DC probe thru 47K to point (C). Common to chassis. (Across Video Det. load)	A1	Adjust for maximum negative voltage.
2.	"	"	"	41.8MC	"	"	A2	"
3.	"	"	44.0MC (10MC Swp)	44.0MC	"	USE SCOPE Vert. Amp. thru 47K to point (C). Low side to chassis. (Across Video Det. load)	A3	Adjust to peak curve at 44.0MC marker.
4.	"	"	"	44.75MC	"	"	A4	Adjust until high frequency peak falls at 44.75MC marker. Retouch A3 to obtain a symmetrical double peaked response similar to Fig. 1.
5.	Direct	Place a thin insulated metal strip between the Mixer-Osc. tube (V202), and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	"	41.25MC	"	"	A5	Detune by turning slug several turns clockwise. Then adjust to place marker in trap notch as in Fig. 2.
6.	"	"	"	44.0MC 45.75MC	"	"	Mixer Plate Coil & A6	Adjust Mixer Plate Coil for maximum gain at 44.0MC. Adjust A6 for a symmetrical response which rocks about 44.0MC. 45.75MC marker should fall at about 50% as in Fig. 2.
7.	"	"	"	47.25MC	"	"	A7	Adjust to place 47.25MC marker in trap notch as in Fig. 2.

SOUND IF ALIGNMENT

Tune in a strong TV signal, preferably one with a test pattern and tone signal.
Adjust the Fine Tuning for best reception. Set the Volume so that the sound is audible. Adjust A8 for maximum sound output.
Connect a short clip lead from pin 1 (grid) of the 3rd Video IF to chassis.
Connect the DC probe of a VTVM to point (D). Common to chassis. Adjust A9 for maximum negative voltage on the VTVM. Remove the clip lead from the circuit.
Disconnect the antenna lead and place it near the antenna terminals so that the signal coupled to the receiver produces a very weak picture. A hiss will be noticed in the sound. Adjust A10 for maximum negative voltage on the VTVM. Adjust A11 for maximum negative voltage on the VTVM. If the VTVM indicates a broad response while adjusting A11, move the antenna lead farther from the antenna terminals.

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGE 15

FIG.1

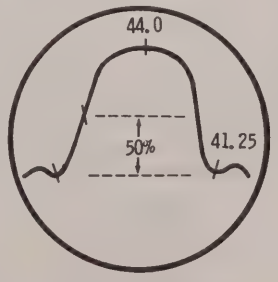


FIG.2

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	1st Video IF Amp	3BZ6	
V2	2nd Video IF Amp	3BZ6	
V3	3rd Video IF Amp	3DK6	3CB6 *
V4	Video Output-Video Output	6BH6	
V5	Sound IF-Vert. Mult.	5CL8A	
V6	Sound Det	3DT6	
V7	Audio Output	12CU5/ 12C5	

ITEM No	USE	TYPE	NOTES
V8	Sync Sep	3CS6	3BY6 *
V9	Vert. Mult.-Vert. Output	12AW6GT	12EN6 *
V10	Horiz Mult.	6CG7	
V11	Horiz Output	12DQ6A	
V12	Damper	12D4	
V13	HV Rect	1B3GT	

* Alternate

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	Westinghouse PART No	GENERAL ELECTRIC PART No.	RCA PART No	SYLVANIA PART No	
V14	21CBP4B		21CBP4-A ①	21CBP4/ ② 21CBP4A ③	① "Aluminized" ② "Silver Screen 65"

ELECTROLYTIC CAPACITORS

ITEM No	RATING CAP	VOLT.	REPLACEMENT DATA Westinghouse PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	FYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	200	175	21SV016H02 ①		XD001B			TVL2-4450 *	
B	200	175							
C	50	175							
D	30	175							
C2	30	25	21SV025H10	SRE25V30	BBR30-25	TC45	TD-30-150	TVA-1410	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer
① Alternate Part #21SV016H01.

FIXED CAPACITORS

Capacity values: given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	VOLT	TOL	REPLACEMENT DATA Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	500			21SY300H18	BPD-0008	DD-801	L10T6	B-382	5GA-T8	
C4	680			R2CC81Z5Z68J(P	BPD-00068	DD-68i	BYA10T68	B-368	5GA-T68	
C5	680			R5CC81Z5Z68J(P	BPD-00068	DD-68i	BYA10T68	B-368	5GA-T68	
C6	1000			21SY300H49	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C7	500			21SY300H18	BPD-0008	DD-801	L10T8	B-382	5GA-T8	
C8	4700			21SV104A72	BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	
C9	1500			21SY300H31	BPD-0015	DD-152	BYA10D15	B-215	5HK-D15	
C10	3000	3000		21SY300H19	BVD-30-680	DD30-68i	HVB30T68	2HV-368		
C11	.047	400		21SV054A73	P488N-047	DF-503	CUB4S47	GEM-6147	47M-S47	
C12	2200			21SV102A22	BPD-0022	DD-222	BYA10D22	B-222	5HK-D22	
C13	56		N220 10%	21SV015A50						
C14	.1	600		21SV051A04	P488N-1	DF-104	CUB4P1	GEM-401	47M-P1	
C15	33		N220	21SV033A30						
C16	.22	400		21SV054A24	P488N-22		CUB4P22	GEM-4022	47M-P22	
C17	.22	400		21SV052A24	P488N-22		CUB4P22	GEM-4022	47M-P22	
C18	4700			21SV104A72	BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	
C19	3.3			V-8963-3396	NPO-SI 3.3	TCZ-3R3	CLOV33C	ZT-5S33	5TCCB-V33	
C20	4.7			V-8963-4796	NPO-SI 4.7	TCZ-4R7	CIOV47C	ZT-5S47	5GA-Q5	
C21	4700			21SV104A72	BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	
C22	1000			21SV102A22	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C23	4700			21SV104A72	BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	
C24	1000			21SV102A02	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C25	.047	200		21SV054A73	P288N-047	DF-503	CUB2S47	GEM-6147	2TM-S47	
C26	.022	600		21SV062A23	P668N-022		CUB6S22	GEM-6122	6TM-S22	
C27	.022	600		21SV062A23	P668N-022		CUB6S22	GEM-6122	6TM-S22	
C28	680	2000		21SV300H19	BVD-30-680	DD30-68i	HVB20T68	2HV-368		
C29	.22	200		21SV042A24	P288N-22		CUB2P22	GEM-2022	2TM-P22	
C30	.22	200		21SV042A24	P288N-22		CUB2P22	GEM-2022	2TM-P22	
C31	4700			21SV104A72	BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	
C32	20000			21SV01A02	BPD-01	DD-103	BYA10SI	B-110	5HK-S1	
C33	.0027	600		20V010H12	P668N-003	DE-272	CUB6D3	GEM-6227	6TM-D27	
C34	.033	600	10%	21SV123A33	Y84C6S33		CUB6S33	GEM-6133	6TM-S33	
C35	.1	400		21SV051A04	P488N-1	DF-104	CUB4P1	GEM-401	47M-P1	
C36	.033	600		20V010H31	P668N-033		CUB6S33	GEM-6133	6TM-S33	
C37	.33	200		21SV033A34	P288N-33		PM6P33	GEM-2033	2WF-P33	
C38	.01	400	10%	21SV051A03	Y84C4S1	DE-103	PM4S1	GTM-411	4TM-S1	
C39	.1	600		21SV051A04	P488N-1	DF-104	CUB4P1	GEM-401	47M-P1	
C40	1000		10%	21SV07A02	1464-001		151D1	MCB255	MS-21	
C41	56			21SV125A50	DE-56	DD-560	L10QS6	UC-5456	5GA-Q56	
C42	15-180			21TV50H01						
C43	.01	400		21SV051A03	P488N-01	DE-103	CUB4S1	GEM-411	4TM-S1	
C44	.22	400		21SV052A24	P488N-22		CUB4P22	GEM-4022	47M-P22	
C45	.047	600		21SV062A47	P668N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C46	100	5000	10%	21SV300H34					90GA-T18 10% *	
C47	.033	600		21SV213A33	P668N-033		CUB6S33	GEM-6133	6TM-S33	
C48	680			R2CC81Z5Z68J(P	BPD-00068	DD-68i	BYA10T68	B-368	5GA-T68	
C49	680			R2CC81Z5Z68J(P	BPD-00068	DD-68i	BYA10T68	B-368	5GA-T68	
C50	680			R2CC81Z5Z68J(P	BPD-00068	DD-68i	BYA10T68	B-368	5GA-T68	
C51	1500	1400		21SY02LA53	BVD-15-1500	DD30-152	HVB2GD25	2HV-S15	2GA-D15	
C52	.15	600		21SV061A54	P688N-15		PM6P15	GEM-6015	6TM-P15	
C53	680	3000		21SV300H19	BVD-30-680	DD30-68i	HVB30T68	2HV-368		

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	WATTS	REPLACEMENT DATA Westinghouse PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	27GV051H01		RTV-505		PP5SA	Volume
B	Switch				Not Req.		Not Req.	Push-Pull Off-On
R2A	60K	½	27GV032H01	B-25	A47-75K-S	GU-135	TA15L	Horiz. Hold
B	Shaft			Not Req.	K28-3	Not Req.	Not Req.	
R3A	2meg	½	27GV060H01	B-75	A47-2meg-S	GU-159	U56	Vert. Hold
B	Shaft			Not Req.	K8-2	Not Req.	Not Req.	
R4A	100K	½	27GV033H03	B-40	A47-100K-S	GU-139	TA15L	Brightness
B	Shaft			Not Req.	K28-3	Not Req.	Not Req.	
R5A	15K	½	27GV032H07	B-20	A47-15K-S	BU-118	TA15JL	Contrast
B	Shaft			Not Req.	P8-3	SK1	Not Req.	
R6A	5meg	½	27GV038H04					Height
B	200K	½						Vert. Linearity

PARTS LIST AND DESCRIPTIONS

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No	RATING OHMS	WATT	Westinghouse PART No.	NOTES
R7	8200Ω		V-9927-3E	
R8	33K		25SV003H32	
R9	470Ω		25SV334A71	
R10	47Ω		RC20AE470K	
R11	8200Ω		V-9927-3I	
R12	47K		25SV003H23	
R13	470Ω		25SV254A2I	
R14	27Ω		RC20AE270K	
R15	470Ω		25SV234A71	
R16	150Ω		RC20AF151K	
R17	3900Ω		25SV213A92	
R18	1meg		25SV2I1A05	
R19	150Ω		RC20AE151K	
R20	1800Ω		RC20AE182K	
R21	3900Ω	2	25SV423A92	
R22	10K		RC20AE103K	
R23	18K		RC20AE183K	
R24	150Ω		RC20AE151K	Note 1
R25	5600Ω		25SV225A63	
R26	100Ω		25SV22IA01	
R27	22K		25SV223A24	
R28	100K		25SV223A04	
R29	15K		RC20AE153J	
R30	470K		25SV2I4A74	
R31	56K		RC20AE563K	
R32	560K		RC20AE564K	
R33	5600Ω	1	RC30AE562K	
R34	820Ω		RC20AE821K	
R35	120K		RC20AE124K	
R36	560K		RC20AE564K	
R37	680Ω		25SV228A68	
R38	560Ω	5	25IV020H53	
R39	180Ω		RC30AE181K	
R40	18meg 5%		25SV2I1A86	
R41	100K		25SV22IA04	
R42	6800Ω		25SV216A82	
R43	470K		25SV2I4A74	
R44	47K		25SV2I4A73	
R45	47K		RC30AE233K	
R46	10K	2	RC42A103K	
R47	56K		RC20AE563K	
R48	22K		RC30AE223J	
R49	39K		RC20AE393K	
R50	18K		RC20AE183K	Note 2
R51	27K	1	RC30AE273K	
R52	10K 5%		25SV2I1A03	
R53	5600Ω		25SV225A63	
R54	180K		RC20AE184K	
R55	1meg		25SV2I1A05	
R56	150Ω		RC20AE151K	
R57	180K		25SV2I1A54	
R58	4.7meg		RC20AE475K	
R59	2.2meg	1	25SV322A25	
R60	1meg		25SV2I1A05	
R61	3300Ω		RC30AF332J	
R62	560Ω		RC20AE561K	
R63	560Ω		RC20AE561K	
R64	680K		25SV228A84	
R65	47K		25SV2I4A73	
R66	39K	1	RC30AE393K	
R67	82K		RC20AF823J	
R68	1000Ω		25SV22IA02	
R69	220K 5%		25SV22IA24	
R70	560K		RC20AE564K	
R71	220K		25SV222A24	
R72	330K	1	RC30AE334K	
R73	470K		25SV2I4A74	
R74	150Ω		RC20AE151K	
R75	5600Ω	2	RC42AE562K	
R76	2.2Ω		25IV002A29	
R77	2200Ω		RC20AE222K	
R78	15K		RC20AE153J	
R79	180Ω	7	25IV020H52	
R80	7.5Ω		25SV007H02	
R81	33Ω	15	25IV017H09	Note 3

Note 1. Not used in some versions.
Note 2. Some versions may use 100K in this application (Part #250V22IA04).
Note 3. Ch. V-2374-2 uses 29Ω 15W in this application (Part #25IV017H20).

COILS (RF-IF)

ITEM No	USE	REPLACEMENT DATA Westinghouse PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	41.25MC Trap	23OV069H01						
L2A	1st Video IF	23SV023H08						
B	47.25MC Trap							
L3	2nd Video IF							
L4	3rd Video IF	23SV020H03						
L5	4th Video IF	23SV005H03						
L6	RF Choke	23OV019H10	19-1006	19-1006		4634		Includes M3
L7	Shunt Peaking Coil	23OV034H02	19-3100	19-3100	TV-194	6112	VP-3	14uh
L8	4.5MC Trap	23OV030H02						100uh
L9	Series Peaking Coil	23OV034H03	19-3125	19-3125	TV-196	6120		140uh
L10	Shunt Peaking Coil	23OV034H05	19-4301	19-4301	TV-197	6184		200uh
L11	1st Sound IF	23OV030H27						
L12	2nd Sound IF	23SV046H01						
L13	Quadrature Coil	23OV031H01						
L14	RF Choke	23OV019H10	19-1006	19-1006		4634		14uh
L15	RF Choke	23OV019H10	19-1006	19-1006		4634		14uh

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	SEC.	REPLACEMENT DATA Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No.	NOTES
L16	100Ω		23OV032H01						

FILTER CHOKE

ITEM No	RATINGS CURRENT (Measured)	DC RES	INDUCTANCE (0 CURRENT 1000 Cy.)	REPLACEMENT DATA Westinghouse PART No	Halldorson PART No	Merit PART No	Ram PART No	Stancor PART No.	Thordarson PART No.	Triad PART No.
L17	300A	20Ω	.5 Hy.	43OV064H01						

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA Westinghouse PART No	Halldorson PART No	Merit PART No	Ram PART No	Rogers PART No	Stancor PART No	Thordarson PART No	Triad PART No
T1	Vert. Output	43OV033H03							
	Alt. Vert. Output	43OV033H02							
T2	Yoke-Horiz. (20MH) (90°)-Vert. (32MH)	49OV004H01M	Y-16 ①②	MDF-92 ①③	Y90F19/43 ②③	PCM2045 ①②	DY-16A ①②	Y-16 ①②	Y-41 & NW-3 & YC-4 & CL-1 ③
	Alt. Yoke	49OV004H01	Y-16 ①②	MDF-92 ①③	Y90F19/43 ②③	PCM2045 ①③	DY-16A ①③	Y-16 ①②	Y-41 & NW-3 & YC-4 & CL-1 ③
	Yoke Clamp	76SV014H04							
T3	Horiz Output	49OV003H05							

① Requires new rear cover, centering device and yoke clamp. Use original yoke damping network, if necessary.
② Connect same as original.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	SEC.	REPLACEMENT DATA Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No	NOTES
T4	2800Ω	3-4Ω	43OV063H01	24853	A-3025	AU-605	A-3332	24853	S-12X	

SPEAKER

ITEM No.	TYPE SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA Westinghouse PART No.	QUAM PART No	NOTES
SP1	5"	PM	3-4Ω	57OV045H01 ①	5A1	① Used in Models H-21T263, 264, 288, H-21TU283, H-21TU364
	8"	PM	3-4Ω	57OV016H02 ②	8A31	② Used in Models H-21K270, 271, H-21KU270, H-21KU271

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Westinghouse PART No.	REPLACEMENT DATA
IC1	Sync Coupling	270mmf, 10000mmf, 470K, 1.5meg	21SV030H01	
IC2	Vert. Integrator	2000mmf, 4700mmf, 5000mmf, 5200mmf, 8200Ω, 820Ω, 22K	21SV029H01	
IC3	Horiz. AFC	82mmf, 82mmf, 390mmf, 390mmf, 680mmf, 10K, 15K, 680K, 1meg	21SV028H01	
IC4	Isolation	1000mmf ② 1500V, 330K	21SV004H03	Sprague ACI-8

RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA Westinghouse PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.300A	29SV006H03 ①	HF504 ①	SD94A ①	M500 ①		① Silicon Type.
M3		29SV004H01 ②	K1615 ③	1T1 ②③			② Selenium Type.
							③ Two Required.

CRYSTAL DIODES

ITEM No	ORIG. TYPE	REPLACEMENT DATA Westinghouse PART No.	CBS PART No.	SYLVANIA PART No.	NOTES
M3	1N295	29SV002H01	1N295	1N3595	Video Det. (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
M4	Tuner	47OV057H02	VHF Ch. V-2374-1
	Tuner	47OV058H02	VHF Ch. V-2374-1
	Tuner	47OV060H03	VHF with UHF provisions Ch. V-2374-2
	Tuner	47OV024H01	UHF Ch. V-2374-2
	Tuner	47OV024H03	UHF Ch. V-2374-2
	Tuner	47OV034H03	UHF Ch. V-2374-2
	Printed Board	35OV059H01	

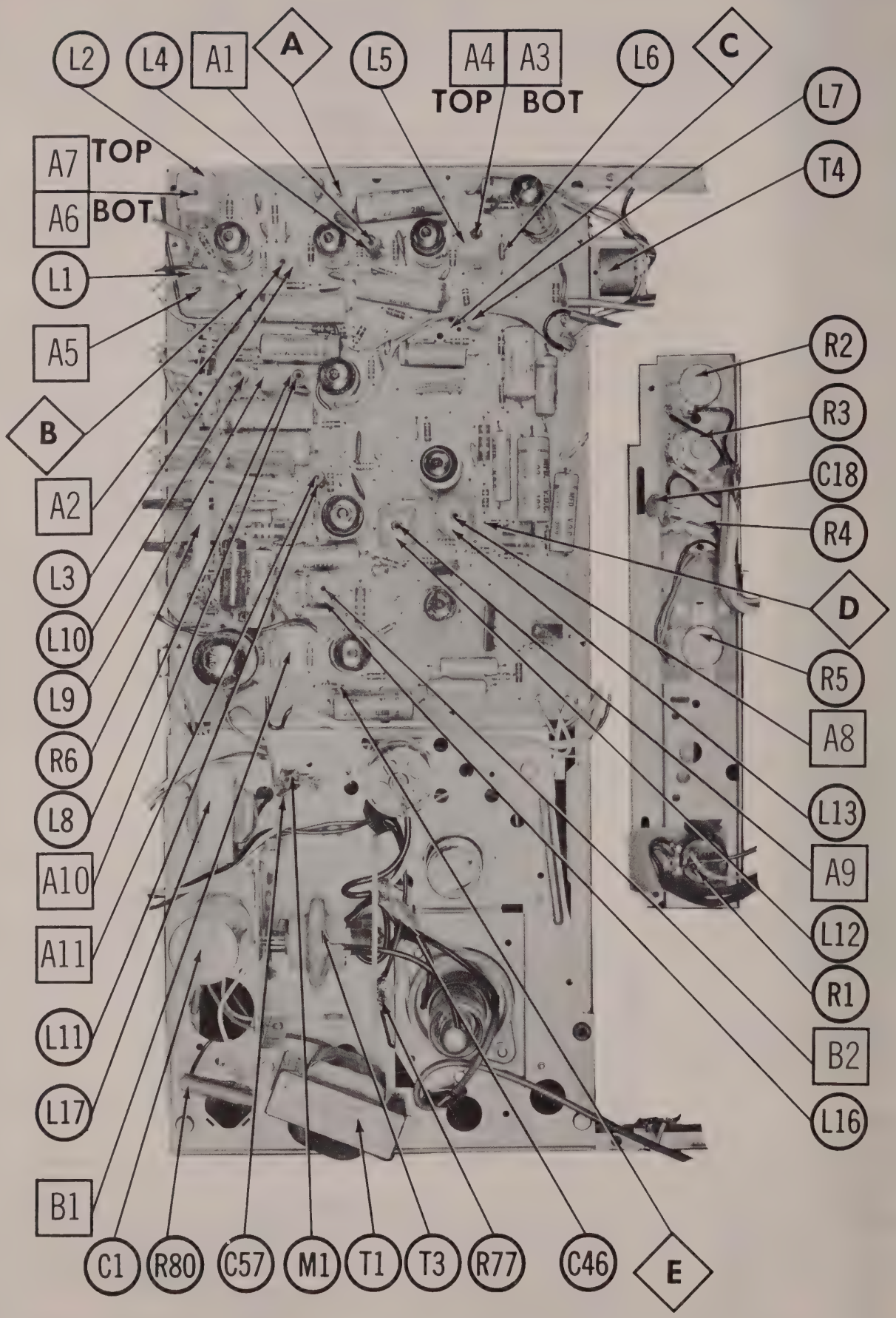
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

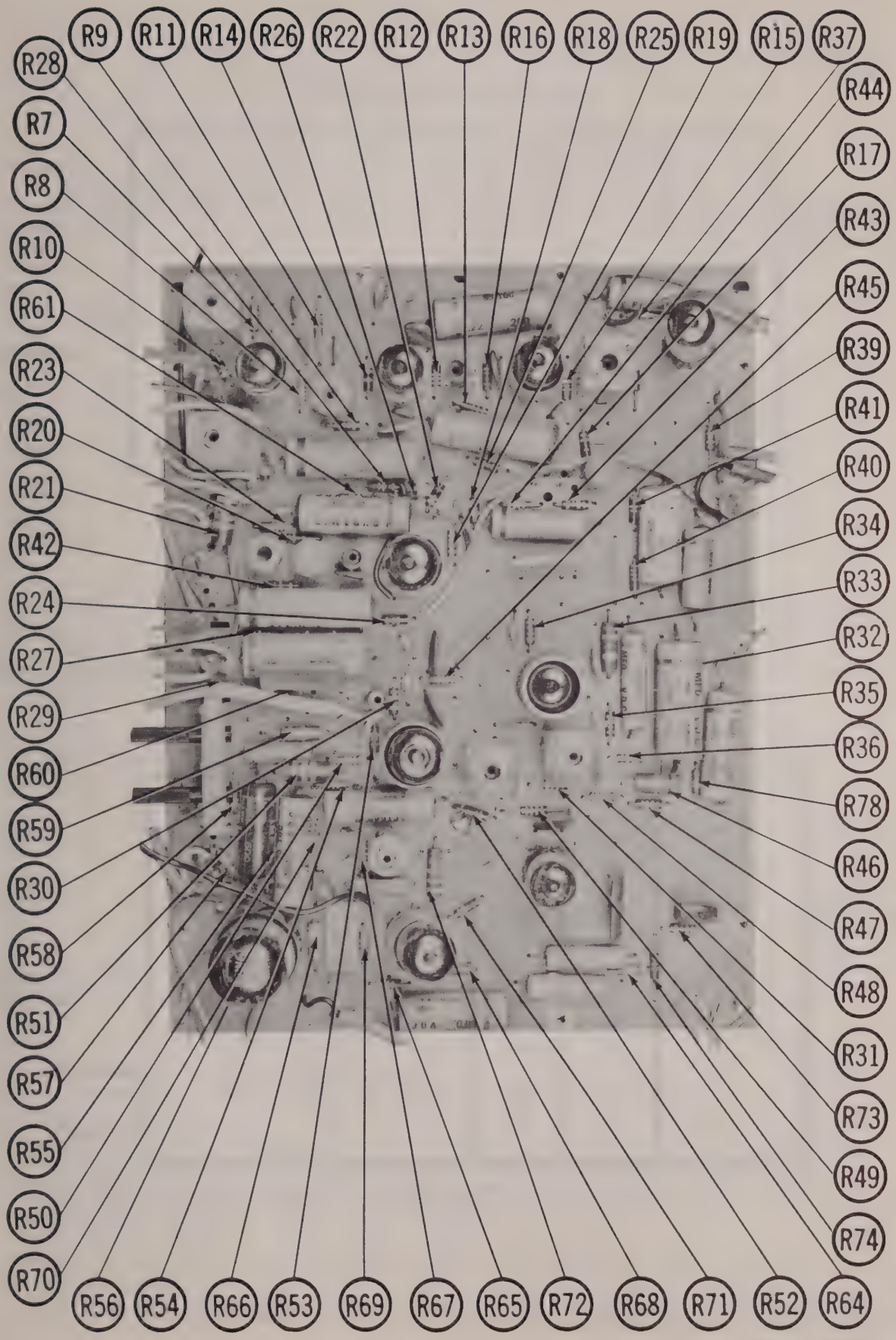
NAME	PART NO.	DESCRIPTION
Mask	61OV007H04	
Safety Glass	63OV009H02	All Models except H-21T266
Safety Glass	63OV009H01	Model H-21T266
Knob	55OV100H01	VHF Channel Selector
Knob	55OV050H01	UHF Channel Selector
Knob	55OV078H01	Fine Tuning
Knob	55OV101H01	On-Off-Volume, Contrast
Knob	55OV044H01	Brightness, Horiz. Hold, Vert. Hold
Cabinet	51OV01I23	Model H-21T263
Cabinet	51OV01I34	Model H-21T364
Cabinet	51OV01I30	Model H-21TU263
Cabinet	51OV01I31	Model H-21TU264
Cabinet	51OV063H03	Model H-21KU270
Cabinet	51OV063H04	Model H-21KU271
Cabinet	51OV063H01	Model H-21K270
Cabinet	51OV063H02	Model H-21K271
Cabinet	51OV01I25	Model H-21T266
Leg	51BV001H04	Models H-21K270, H-21KU270
Leg	51BV001H05	Models H-21K271, H-21KU271

WIRING DATA

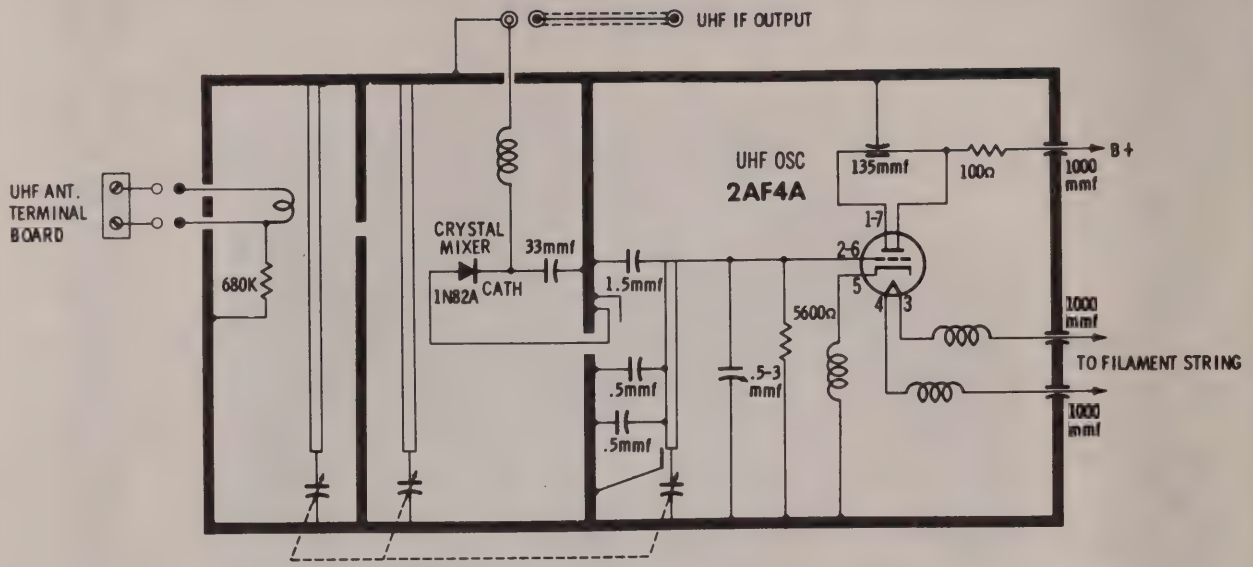
High Voltage Lead	Use BELDEN No. 8899
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8534 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8876
300Ω Tuner Input Lead	Use BELDEN No. 8235
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8464 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 6 Conductor



CHASSIS - TOP VIEW



PRINTED BOARD - RESISTOR IDENTIFICATION



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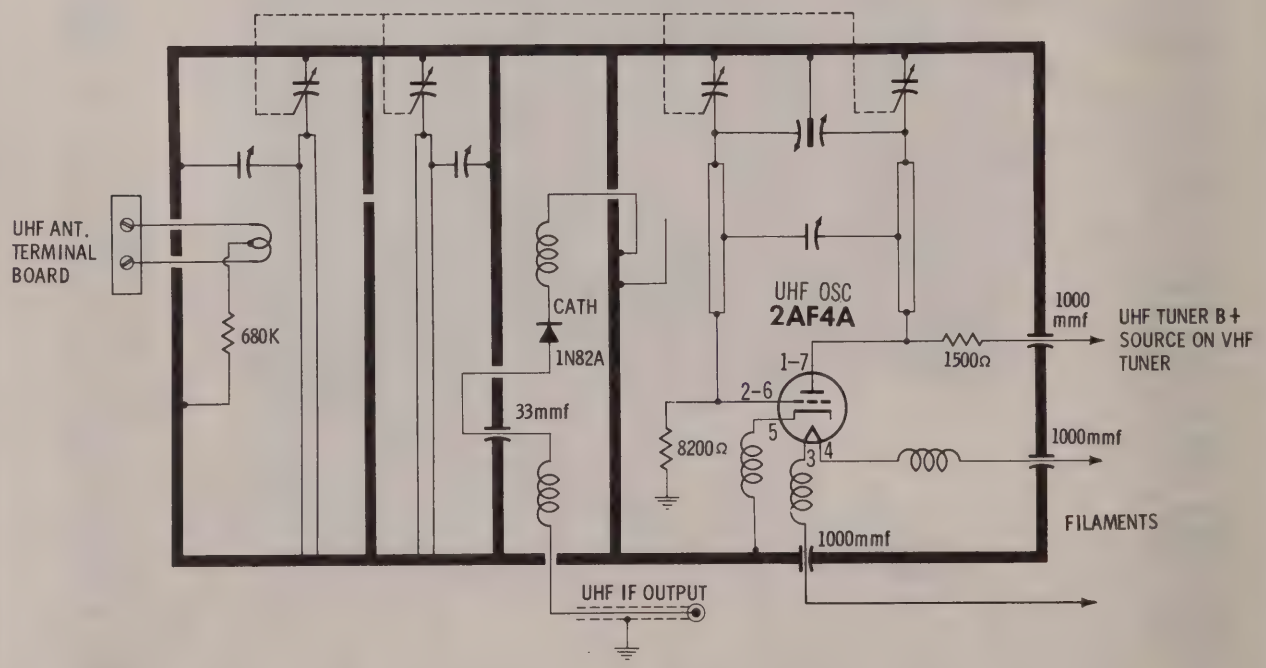
UHF TUNER 472V034H01



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UHF TUNER 472V024H01, 03

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS FOR TUNERS 470V059H02, 470V060H02

Use an ISOLATION TRANSFORMER TO PROTECT the Test Equipment.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 4.5 volt bias supply to point Ⓣ. Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC	193.25MC 197.75MC	10	Vert. Amp. thru 10K to point Ⓓ. Low side to chassis.	A201, A202, A203	Adjust A201 and A202 for maximum amplitude and symmetry with markers as shown in Fig. 201. Increase bias for MINIMUM amplitude of response curve. Without changing the bias adjust A203 to obtain MINIMUM response on the scope.
2.	"	"	213MC	211.25MC 215.75MC	13	"	A204	Adjust for maximum amplitude of response similar to Fig. 201. Adjust by expanding or compressing coil turns.
			207MC	205.25MC 209.75MC	12		A205	
			201MC	199.25MC 203.75MC	11		A206	
			195MC	193.25MC 197.75MC	10		A207	
			189MC	187.25MC 191.75MC	9		A208	
			183MC	181.25MC 185.75MC	8		A209	
			177MC	175.25MC 179.75MC	7		A210	
			85MC	83.25MC 87.75MC	6		A211	
			79MC	77.25MC 81.75MC	5		A212	
			69MC	67.25MC 71.75MC	4		A213	
			63MC	61.25MC 65.75MC	3		A214	
			57MC	55.25MC 59.75MC	2		A215	

FIG. 201

VHF OSCILLATOR ALIGNMENT

Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the Fine Tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K across Video Det. load.	A216	Adjust to place sound marker in trap notch as in Fig. 202. Video marker should fall at 50%.
			207MC	205.25MC 209.75MC	12		A217	
			201MC	199.25MC 203.75MC	11		A218	
			195MC	193.25MC 197.75MC	10		A219	
			189MC	187.25MC 191.75MC	9		A220	
			183MC	181.25MC 185.75MC	8		A221	
			177MC	175.25MC 179.75MC	7		A222	
			85MC	83.25MC 87.75MC	6		A223	
			79MC	77.25MC 81.75MC	5		A227	
			69MC	67.25MC 71.75MC	4		A225	
			63MC	61.25MC 65.75MC	3		A226	
			57MC	55.25MC 59.75MC	2		A227	

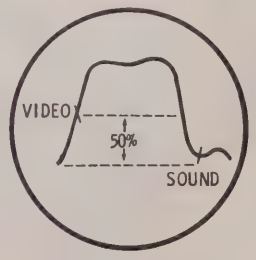


FIG. 202

PRE-ALIGNMENT INSTRUCTIONS FOR TUNER #470V057H02

Suggested alignment tools: A201 thru A208 ..... General Cement #5009, 8195, 8274, 8275, 8728, 8987
Walsco #2531

VHF OSCILLATOR ALIGNMENT

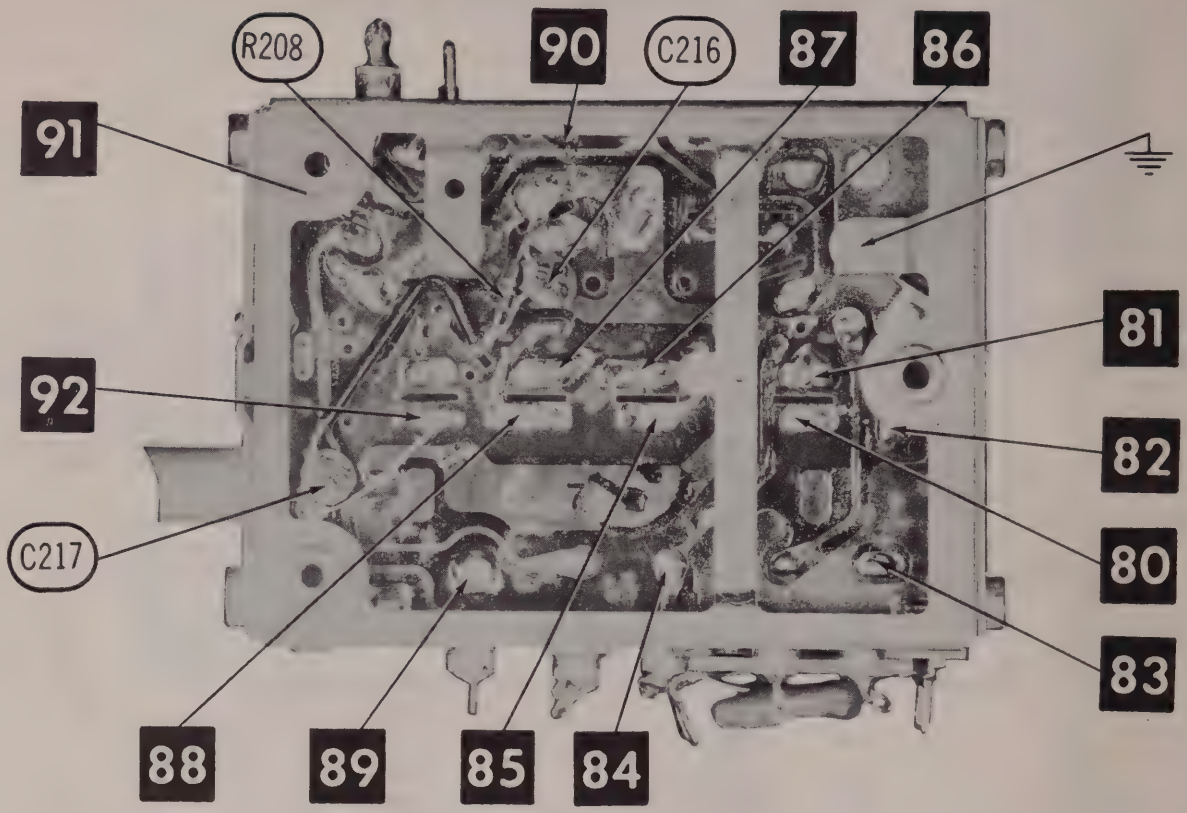
Set the Fine Tuning to the center of its range. Set the Channel Selector to the highest channel operating in the area and adjust the appropriate slug for best picture and sound. The slug for each channel operating in the area must be adjusted in a descending order from the highest to the lowest: A201 for channels 13 and 12, A202 for channels 11 and 10, A203 for channels 9 and 8, A204 for channel 7, A205 for channel 6 and 5, A206 for channels 4 and 3, and A207 for channel 2. If difficulty is experienced in adjusting channels 12, 10, 8, 5 or 3, adjust the correct coil for that channel by compressing or expanding coil turns for best picture and sound.

RF AND MIXER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

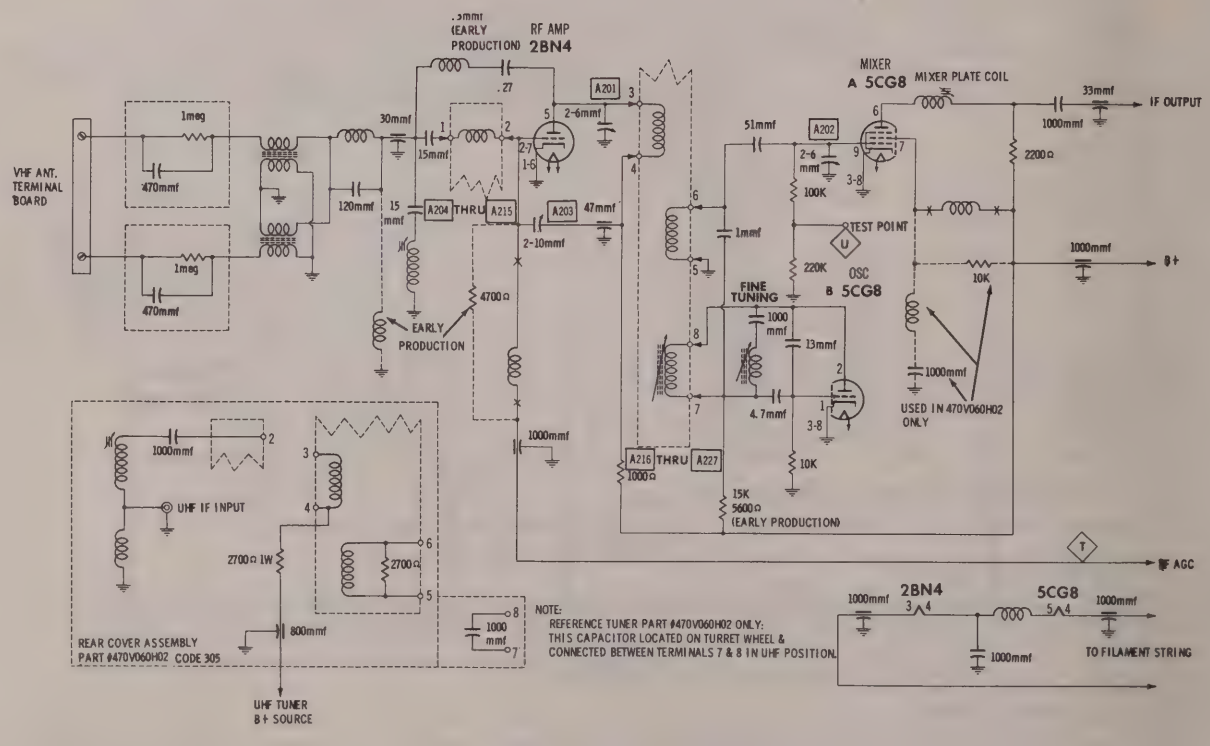
RF TRAP ALIGNMENT

A208 may be adjusted to attenuate any interfering signal between 40MC and 46MC. Observe the picture and adjust for MINIMUM beat interference.



A Howard W. Sams CIRCUITRACE* Photo

TUNER 470V057H02
BOTTOM VIEW



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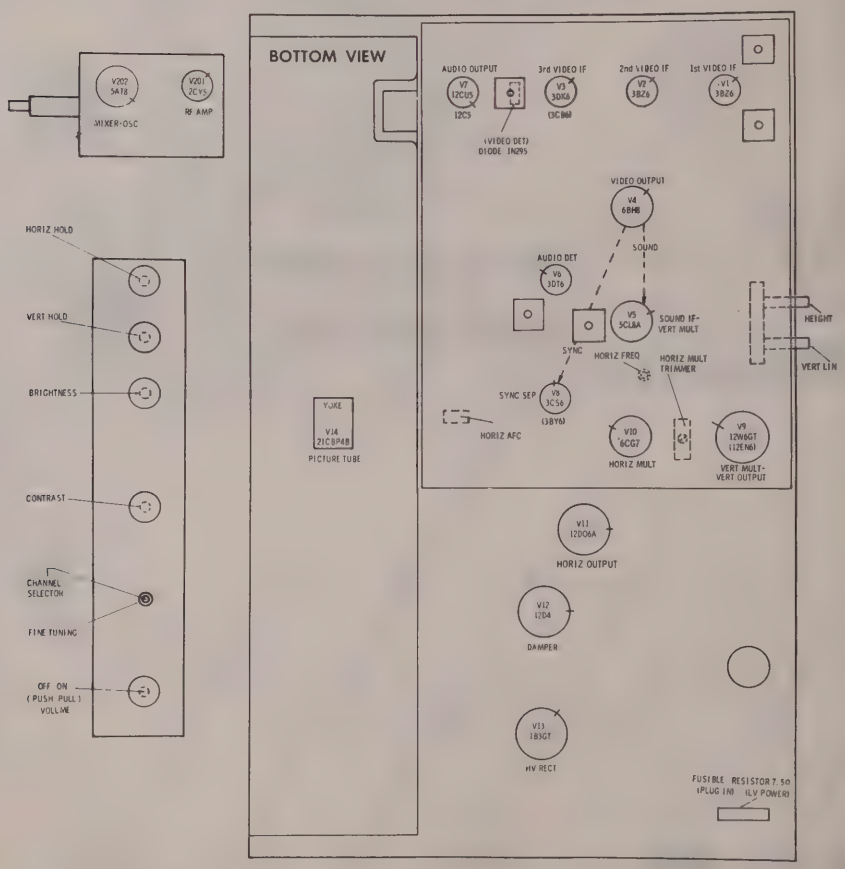
VHF TUNER 470V059H02, with UHF provisions, 470V060H02

RESISTANCE MEASUREMENTS

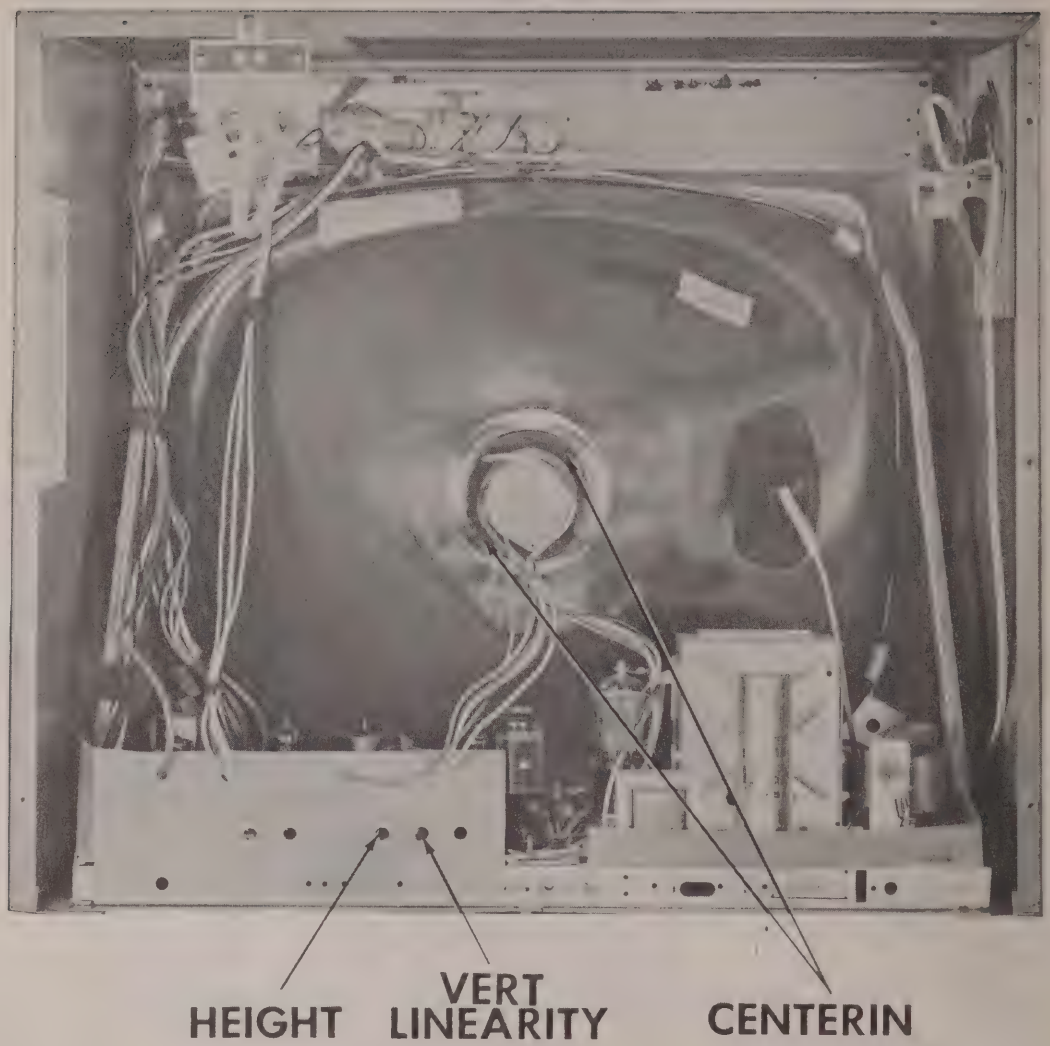
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3BZ6	480K	47Ω	4Ω	4.5Ω	†650Ω	†650Ω	0Ω		
V2	3BZ6	480K	27Ω	4.5Ω	5Ω	†650Ω	†650Ω	0Ω		
V3	3DK6	.1Ω	150Ω	5Ω	6Ω	†650Ω	†650Ω	0Ω		
V4	6BH8	100Ω	●6500Ω	†5800Ω	10Ω	8Ω	150Ω	1meg	†180Ω	†4100Ω
V5	5CL8A	●2.7meg	●†2.8meg	5600Ω	12Ω	11Ω	†56K	†56K	0Ω	470K
V6	3DT6	4.5Ω	820Ω	10Ω	11Ω	†560K	†5800Ω	560K		
V7	12CU5/ 12C5	180Ω	0Ω	6Ω	8Ω	0Ω	†1200Ω	†790Ω		
V8	3CS6	27K	0Ω	12Ω	13Ω	†30K	†10K	1.8meg		
V9	12W6GT	NC	13Ω	†180Ω	†50Ω	● 1meg	NC	16Ω	0Ω	
V10	6CG7	†250K	●240K	1000Ω	1.5Ω	0Ω	†39K	1.2meg	1000Ω	0Ω
V11	12DQ6A	NC	18Ω	NC	†560Ω	470K	NC	20Ω	.5Ω	TOP CAP †11Ω
V12	12D4	NC	NC	¶300K	NC	†1Ω	NC	18Ω	16Ω	
V13	1B3GT		PINS	1 THRU 8	HAVE	INFINITE	RESISTANCE			TOP CAP †695Ω
V14	21CBP4B	1.5Ω	100K	Pin 6 †180Ω	Pin 10 †30K	Pin 11 ●240K	Pin 12 2.5Ω			
V201	2CY5	550K	0Ω	2.5Ω	3Ω	†180Ω	†13K	0Ω		
V202	5AT8	15K	†4900Ω	0Ω	4Ω	3Ω	†3500Ω	†2000Ω	0Ω	100K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 135V SOURCE.
‡ MEASURED FROM PIN 3 OF V12.

NC NO CONNECTION.
TP TIE POINT.



TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Suggested Alignment Tools:

B1 ....GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

B2 ... GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

Connect a short clip lead across the Horizontal Frequency coil (L16).

Set the Horizontal Hold control to the center of its range.

Connect the DC probe of a VTVM to point (E). Common to chassis.

Tune in a TV station and adjust the Horizontal Multivibrator Trimmer (B1) for zero volts on the VTVM. If zero can be approached but not reached, set the Horizontal Hold control slightly to one side of center for zero voltage.

Remove the jumper from L16 and adjust the Horizontal Frequency slug (B2) for zero reading on the meter. Check lock-in action by switching from channel to channel. The picture should pull into synchronization on all channels.

PHOTOFACT* Folder
*TRADE MARK
EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

**PRODUCTION CHANGE
BULLETIN 223**

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 3 IN SET 387	
	Packard-Bell Model 17VT4 (Ch. V8-2) was covered in PHOTOFACT Folder 3 - Set 387. Models 17VC1, 17VT3, 17VT4, 17VT8, 17VT9 and 21VT4 are added, and are electrically identical except for the changes given in this bulletin.
Model 21VT4	COMPONENT CHANGES An .022mfd @ 600V capacitor is added from pin 2 of V17 (Picture tube) and ground. A 39K resistor is added from pin 2 of V17 (Picture tube). and ground. The jumper wire across the junction of pin 3 of V17 (Picture tube) and R7 (Focus control) to C83 is removed on 21VT4 model only. C89 is decreased from .068mfd @ 1000V to .033mfd @ 1000V. C81 is decreased from 150mmf @ 2500V to 56mmf @ 2500V. C83 is increased from .01mfd @ 600V to .022mfd @ 600V. R90 is decreased from 15K 2W to 12K 2W. R70 is decreased from 120K to 82K. R65 is decreased from 6.8meg to 3.9meg. R66 is decreased from 680K to 150K. R62 is increased from 10K to 22K 2W. R62 is disconnected from the 135V line and reconnected to the 260V line. R67 is increased from 47K to 820K.
Model 17VC1	VHF TUNERS Model 17VC1 uses VHF Tuner Part 10590B. A schematic of this tuner is given on page 2 of PHOTOFACT Set 387 - Folder 3.
Model 17VT3	Model 17VT3 uses VHF Tuner Part #10598. This tuner is electrically identical to Tuner Part #10590B (mentioned above) except for shaft length.
Model 17VT8	Model 17VT8 uses VHF Tuner Part #10618C. A schematic showing this tuner is given in this bulletin.
Model 17VT9	Model 17VT9 uses VHF Tuner Part #10619B. This tuner is electrically identical to Tuner Part #10618C (mentioned above) except for shaft length. A schematic showing this tuner is given in this bulletin.
Model 21VT4	Model 21VT4 uses VHF Tuner Part #10626A. This tuner is electrically identical to Tuner Part #10618C (mentioned above) except for shaft length. A schematic showning the tuner is given in this bulletin.
Model 21VT4	SOUND RATIO DETECTOR Changes made to the Sound Ratio Detector circuit began with Serial No. 88418. V8 (Audio Detector) is changed from 6DT6 to 6BN8. L11 (2nd Sound IF) is changed to Part #29694. L10 (1st Sound IF) is changed to Part #29053C. A partial schematic showing the changes are given in this bulletin.

PACKARD-BELL MODELS 17VC1, 17VT3, 17VT4, 17VT8, 17VT9, 21VT4 (CHASSIS V8-2)

PRODUCTION CHANGE
BULLETIN 223

PRODUCTION CHANGE
BULLETIN 223

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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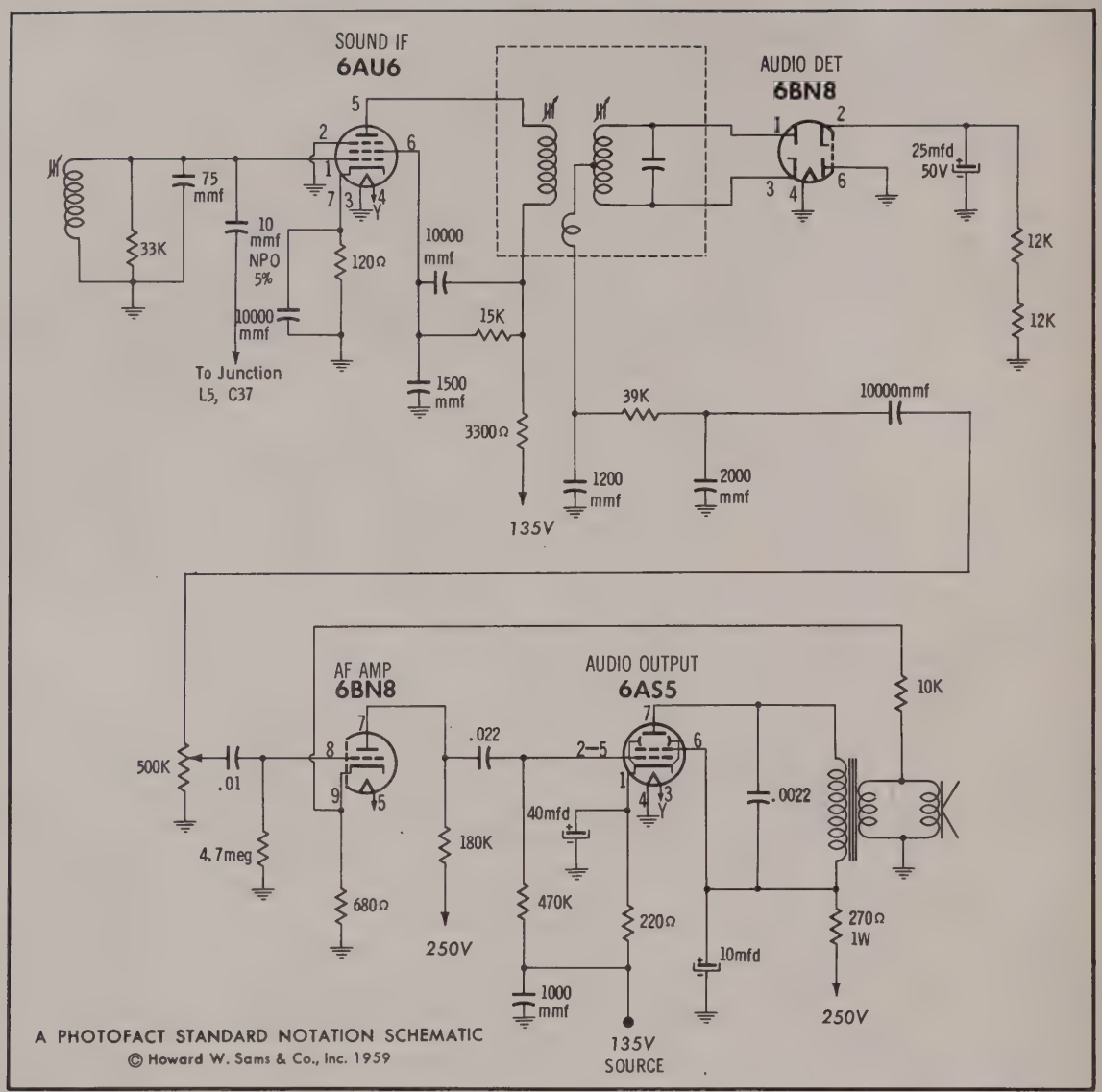
CORRECTION TO PARTS LIST

Note 3 (pertaining to R67) was omitted in notes column of resistors.

Note 4 (pertaining to R94) was omitted in notes column of resistors.

COMPONENT CHANGE

R72 is increased from 1/2 watt to 1 watt.



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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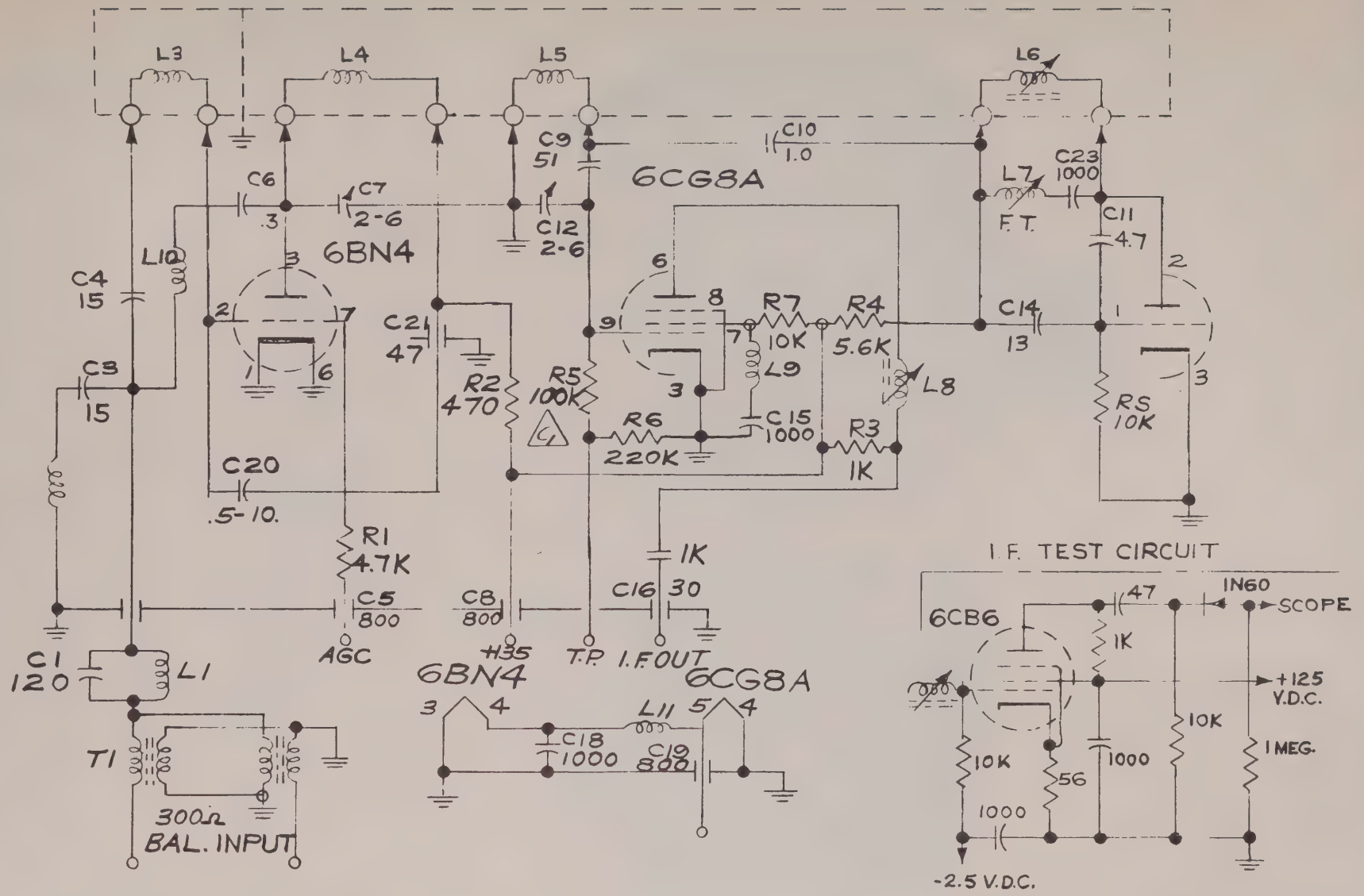

Schematic Diagram Courtesy of PACKARD-BELL ELECTRONICS CORP., SERVICE DIV.

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

ADMIRAL MODELS SS622, SS623, SS624, 622, 623, 624 (Ch. 5T4, A)

ADMIRAL MODELS SS622, SS623, SS624, 622, 623, 624 (Ch. 5T4, A)

MODEL 622

MODEL SS622

ADMIRAL MODELS SS622, SS623, SS624, 622, 623, 624 (Ch. 5T4, A)

TRADE NAME	Admiral Models 622, 623, 624 (Ch. 5T4); SS622, SS623, SS624 (Ch. 5T4A)		
MANUFACTURER	Admiral Corp., 3800 W. Cortland St., Chicago 47, Illinois		
TYPE SET	AC Operated Stereo Amplifier With 4 Speed Automatic Record Changer		
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles	RATING	60 Watts, .58 Amp. @117 Volts AC (Ch. 5T4) 62 Watts, .60 Amp. @117 Volts AC (Ch. 5T4A)

ADMIRAL RECORD CHANGER — RC678-16S

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

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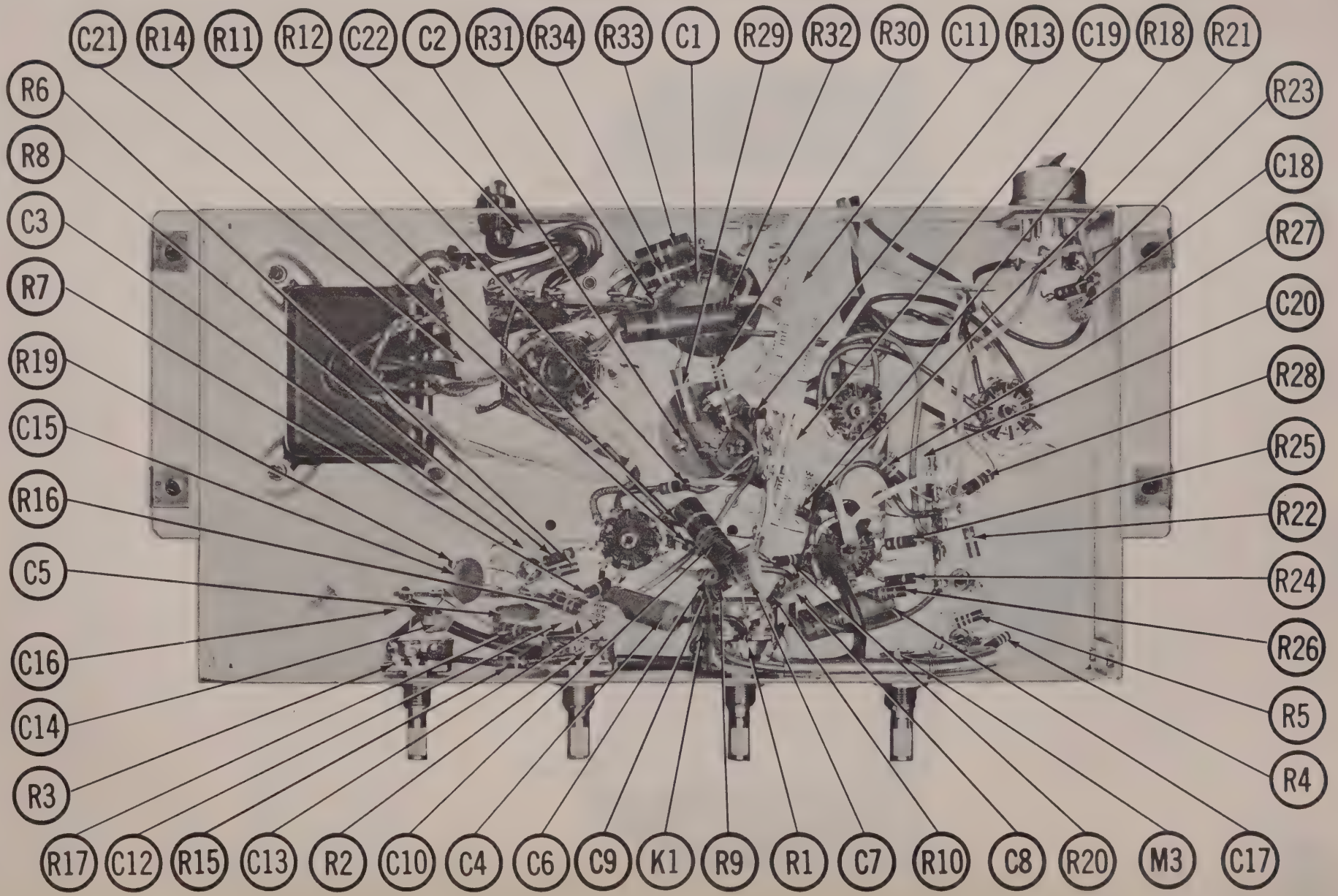
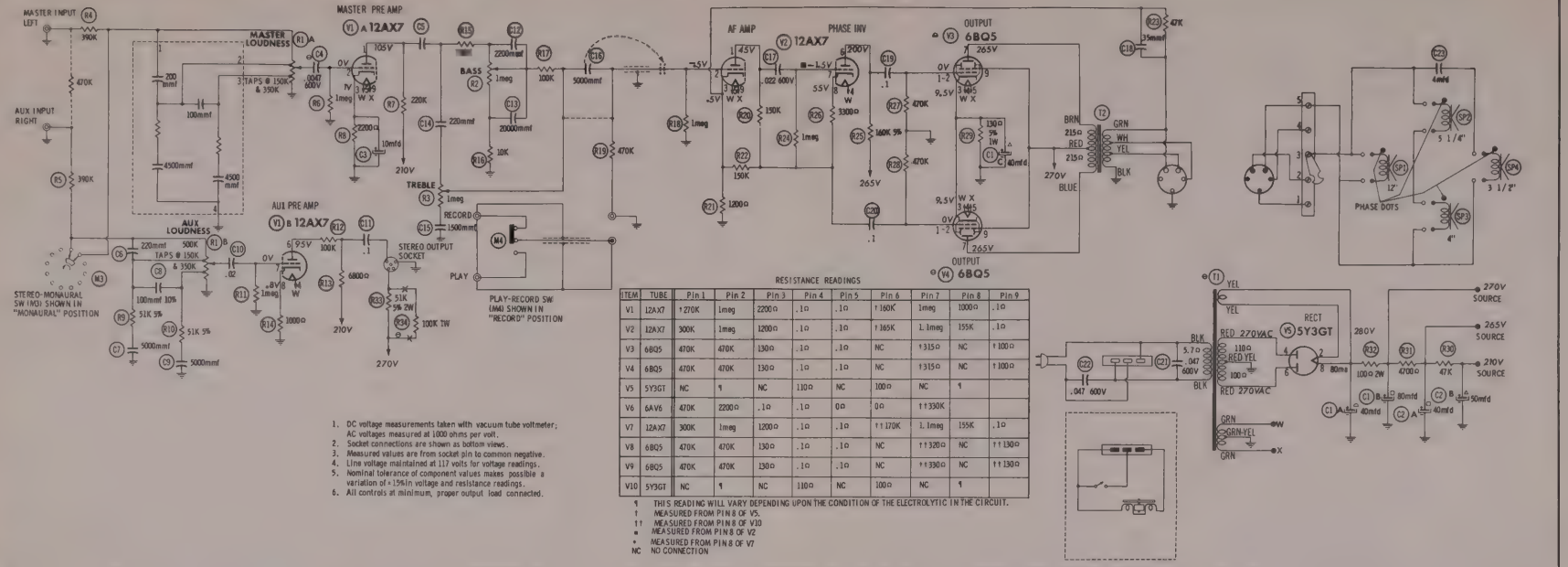


CHASSIS 5T4 — BOTTOM VIEW

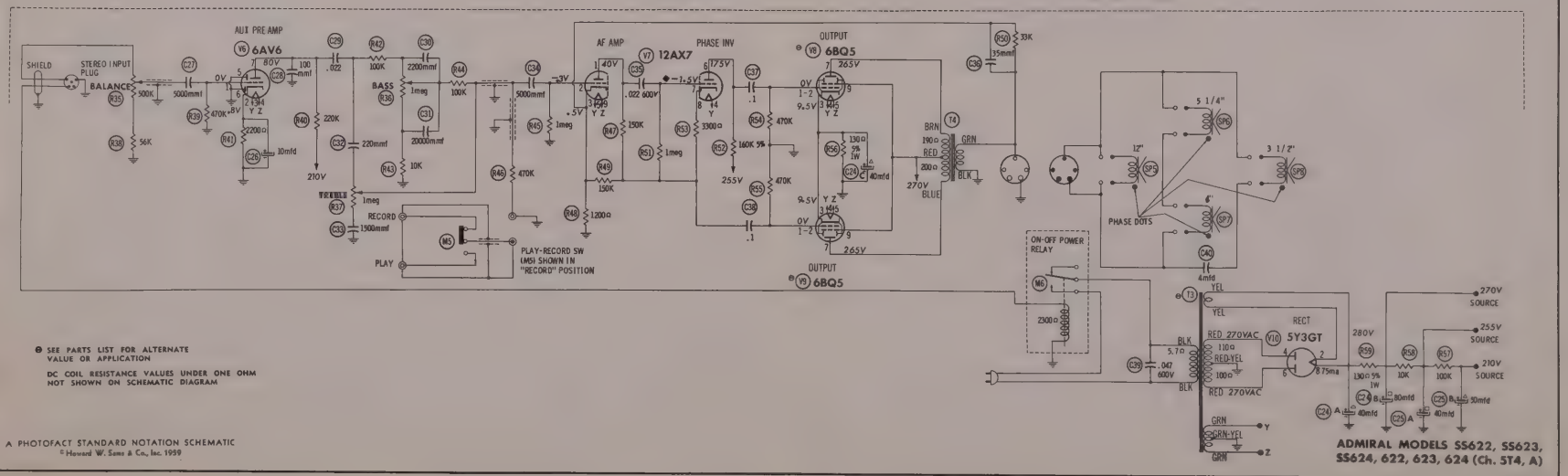


RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†270K	1meg	2200Ω	.1Ω	.1Ω	†160K	1meg	1000Ω	.1Ω
V2	12AX7	300K	1meg	1200Ω	.1Ω	.1Ω	†365K	1.1meg	155K	.1Ω
V3	6BQ5	470K	470K	130Ω	.1Ω	.1Ω	NC	†315Ω	NC	†100Ω
V4	6BQ5	470K	470K	130Ω	.1Ω	.1Ω	NC	†315Ω	NC	†100Ω
V5	5Y3GT	NC	¶	NC	110Ω	NC	100Ω	NC	¶	
V6	6AV6	470K	2200Ω	.1Ω	.1Ω	0Ω	0Ω	††330K		
V7	12AX7	300K	1meg	1200Ω	.1Ω	.1Ω	††170K	1.1meg	155K	.1Ω
V8	6BQ5	470K	470K	130Ω	.1Ω	.1Ω	NC	††320Ω	NC	††130Ω
V9	6BQ5	470K	470K	130Ω	.1Ω	.1Ω	NC	††330Ω	NC	††130Ω
V10	5Y3GT	NC	¶	NC	110Ω	NC	100Ω	NC	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 8 OF V5.
†† MEASURED FROM PIN 8 OF V10
▪ MEASURED FROM PIN 8 OF V2
• MEASURED FROM PIN 8 OF V7
NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.



● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ADMIRAL MODELS 5S622, 5S623, 5S624, 622, 623, 624 (Ch. 5T4, A)

CHASSIS 5T4A — BOTTOM VIEW

ADMIRAL
Ch. 5T4, A

FOLDER 4

Ch. 5T4 PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Master Channel Preamp. - Aux. Channel Preamp.	12AX7	
V2	Master Channel AF Amp. Master Channel Phase Inv.	12AX7	

ITEM No.	USE	TYPE	NOTES
V3	Master Channel Output	6BQ5	EL84 *
V4	Master Channel Output	6BQ5	EL84 *
V5	Rectifier	5Y3GT	

* Alternate.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA ADMIRAL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	350	67D7-37	AFH4-18-45	D0034	FP375.5	TMQ-120	TVL-3724.7	
B	■80	350							
C	▲40	350							
C2A	■40	300	67D7-36	AFH3-181	B0652	FP146	TMS-37	TVL-2708.8	
B	▲50	25				TC29	TD-50-25		
C3	10	6	67B35-7	PWE6010	EC10-6	TT6X10	ML10-6	TE-1087	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA ADMIRAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	.0047	600			P688N-0047	D6-472	CUB6D47	GEM-6247	6TM-D47	①
C5	.022	600		64B8-30	P688N-022	DD-203	CUB6S22	GEM-6122	6TM-S22	
C6	220			65D6-80	SI 220	DD-221	L10T22	B-322	5GA-T22	
C7	5000			65D10-188	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C8	100		10%	65D6-3	DI-100	D6-100	L10T1	CNO-310	5GA-T1S 10% *	
C9	5000			65D10-188	BPD-005	DD-502	BYA10D5	B-250	5HK-D1	
C10	.02	400		64B8-30	P488N-02	DD-203	CUB4S2	GEM-412	4TM-S2	
C11	.1	400		64B8-26	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C12	2200			65D10-89	BPD-0022	DD-222	BYA10D22	B-222	5HK-D22	
C13	20000			65D10-28	BPD-02	DD-203	BYB6S2	B-120	5GA-S2	
C14	220			65D6-80	SI 220	DD-221	L10T22	B-322	5GA-T22	
C15	1500			65D10-103	BPD-0015	DD-152	BYA10D15	B-215	5HK-D15	
C16	5000			65D10-188	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C17	.022	600		64B8-30	P688N-022	DD-203	CUB6S22	GEM-6122	6TM-S22	
C18	35			65D10-78		DD-390	L10Q39		5GA-Q35S *	
C19	.1	400		64B8-26	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C20	.1	400		64B8-26	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C21	.047	600		63B12-1	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C22	.047	600		63B12-1	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C23	4	10		64B13-5						

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
① Some versions may use .022mfd 400V in this application (Part #64B8-30).

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ADMIRAL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	75B46-2				†UE3955	Loudness, Master Chan. Taps
B	500K	½						Loudness, Aux. Chan. Taps
R2A	1meg	½	75D1-116	B-70	A47-1meg-Z	Q13-137	U53	Bass
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R3A	1meg	½	75D1-116	B-70	A47-1meg-Z	Q13-137	U53	Treble
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

† "STA-LOC" equivalent: FA55DT334, RU55DT334, CS3500

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	ADMIRAL PART No.	NOTES
R4	390K		60B8-394	
R5	390K		60B8-394	
R6	1meg		60B8-105	
R7	220K		60B8-224	
R8	2200Ω		60B8-222	
R9	51K 5%		60B7-513	
R10	51K 5%		60B7-513	
R11	1meg		60B8-105	
R12	100K		60B8-104	
R13	6800Ω		60B8-682	
R14	1000Ω		60B8-102	
R15	100K		60B8-104	
R16	10K		60B8-103	
R17	100K		60B8-104	
R18	1meg		60B8-105	
R19	470K		60B8-474	

Note 1. Not used in some versions.

ITEM No.	RATING OHMS	RATING WATT	ADMIRAL PART No.	NOTES
R20	150K		60B8-154	
R21	1200Ω		60B8-122	
R22	150K		60B8-154	
R23	47K		60B8-473	
R24	1meg		60B8-105	
R25	160K 5%		60B7-164	
R26	3300Ω		60B8-332	
R27	470K		60B8-474	
R28	470K		60B8-474	
R29	130Ω 5%	1	60B13-131	
R30	47K		60B8-473	
R31	4700Ω		60B8-472	
R32	100Ω	2	60B21-101	
R33	51K 5%	2	60B19-513	
R34	100K	1		Note 1

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	ADMIRAL PART No.	REPLACEMENT DATA
K1	Tone Comp.	100mmf, 200mmf, 4500mmf, 4500mmf	63B13-2	Aerovox Centralab PC-324 Sprague TC-4

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	RATING SEC. 4	RATING SEC. 5	REPLACEMENT DATA ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⓐ .58A	540 VCT ⓐ .075A	5V ⓐ 2A	6.3VCT ⓐ 1.5A			80C66-1①				PC8405		

① Alternate Part #80B66-1

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	8600Ω CT	16Ω Taps ⓐ 4Ω, 1.6Ω	79D56-12	24S55	A-2904①	AU-609	A-3830	24S55	S-57Z	① Drill new mounting hole

Ch. 5T4 PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ADMIRAL PART No.	QUAM PART No.	
SP1	12"	PM	3-4Ω	78B153-1	12A6A	
SP2	5 1/4"	PM	6-8Ω	78B150-2	52A21Z7.1	
SP3	4"	PM	6-8Ω	78B149-1	4A15Z7.4	
SP4	3½"	PM	4-6Ω	78B148-1	4A1TZ4.4	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	ADMIRAL PART No.	ASTATIC PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	*	13-TB †				* Some versions may use Part #409B33-1-1 (includes needles) † Includes needles & mounting mechanism

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	ADMIRAL PART No.	JENSEN PART No.	WALCO PART No.	
M2	①	† †♦ ♦	S69X or S69XSD or S69XDD	W-103STSS † or W-103STDS ♦†	† Jewel ♦ Diamond

① Versions using cartridge Part #409B33-1-1 use needles Part #98C15-100 or 98C15-102 and 98C15-101.

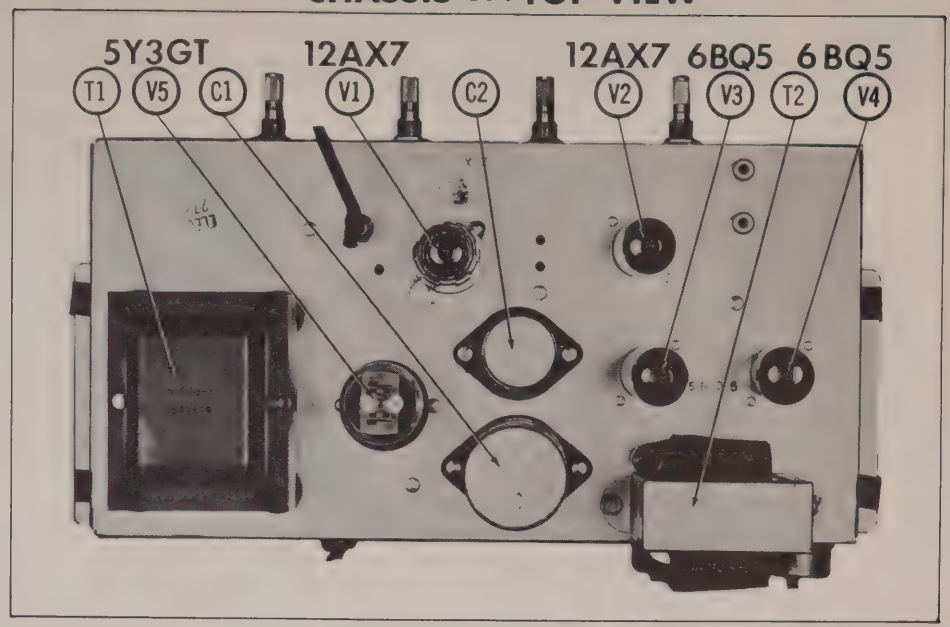
MISCELLANEOUS

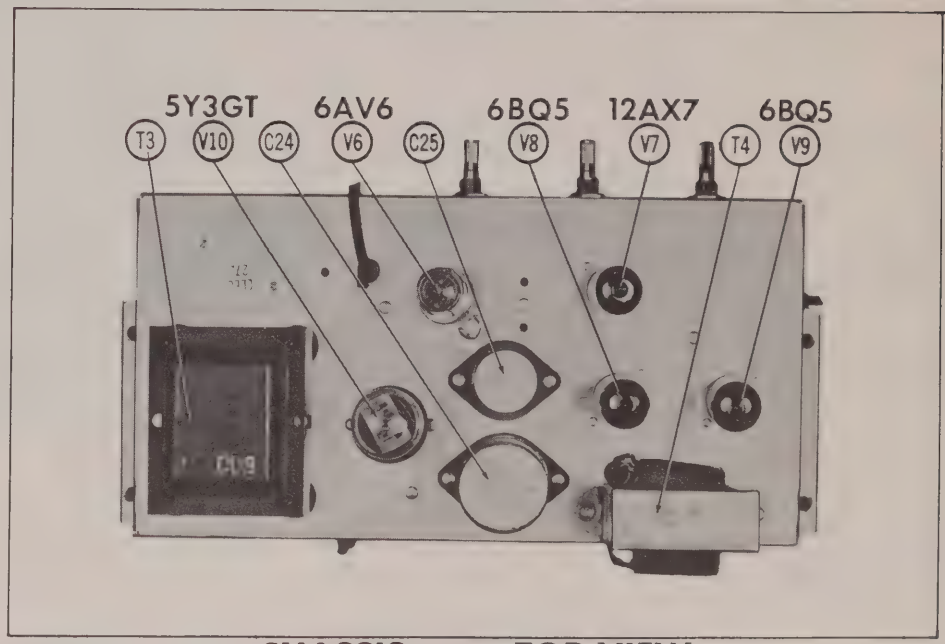
ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
M3	Switch	77A88-1	Stereo-Monaural, (Rotary Wafer Type)
M4	Switch	77A20-3	Play-Record (SPDT, Slide Type)

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No.	1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No.	8401
Phono Pick-up Arm Cable	Use BELDEN No.	8430 (Two Conductor - Twisted)

CHASSIS 5T4 TOP VIEW





CHASSIS 5T4A TOP VIEW

Ch. 5T4A PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V6	Aux. Channel Preamp.	6AV6	
V7	Aux. Channel AF Amp. - Aux. Channel Phase Inv.	12AX7	
V8	Aux. Channel Output	6BQ5	EL84 *
V9	Aux. Channel Output	6BQ5	EL84 *
V10	Rectifier	5Y3GT	

* Alternate.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA ADMIRAL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C24A	▲40	350	67D7-37	AFH4-18-45	D0034	FP375.5	TMQ-120	TVL-3724.7	
B	■80	350							
C	▲40	350							
C25A	■40	300	67D7-36	AFH3-181	B0652	FP146	TMS-37	TVL-2708.8	
B	▲50	25				TC29	TD-50-25		
C26	10	6	67B35-7	PWE6010	EC10-6	TT6X10	ML10-6	TE-1087	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA ADMIRAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C27	5000			65D10-188	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C28	100			65D6-3	SI 100	D6-100	L10T1	CNO-310	5GA-T1	
C29	.022	400		64B8-30	P488N-022	DD-203	CUB4S22	GEM-4122	4TM-S22	
C30	2200			65D10-89	BPD-0022	DD-222	BYA10D22	B-222	5HK-D22	
C31	20000			65D10-137	BPD-02	DD-203	BYB6S2	B-120	5GA-S2	
C32	220			65D6-80	SI 220	DD-221	L10T22	B-322	5GA-T22	
C33	1500			65D10-103	BPD-0015	DD-152	BYA10D15	B-215	5HK-D15	
C34	5000			65D10-188	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C35	.022	600		64B8-30	P688N-022	DD-203	CUB6S22	GEM-6122	6TM-S22	
C36	35			65D10-78		DD-390	L10Q39		5GA-Q35S *	
C37	.1	400		64B8-26	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C38	.1	400		64B8-26	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C39	.047	600		63B12-1	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C40	4	10		64B13-5						

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ADMIRAL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R35	500K	½	75D1-119					Balance
R36A	1meg	½	75D1-116	B-70	A47-1meg-Z	Q13-137	U53	Bass
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R37A	1meg	½	75D1-116	B-70	A47-1meg-Z	Q13-137	U53	Treble
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	ADMIRAL PART No.	NOTES
R38	56K		60B8-563	
R39	470K		60B8-474	
R40	220K		60B8-224	
R41	2200Ω		60B8-222	
R42	100K		60B8-104	
R43	10K		60B8-103	
R44	100K		60B8-104	
R45	1meg		60B8-105	
R46	470K		60B8-474	
R47	150K		60B8-154	
R48	1200Ω		60B8-122	
R49	150K		60B8-154	
R50	33K		60B8-333	
R51	1meg		60B8-105	
R52	160K 5%		60B7-164	
R53	3300Ω		60B8-332	
R54	470K		60B8-474	
R55	470K		60B8-474	
R56	130Ω 5%	1	60B13-131	
R57	100K		60B8-104	
R58	10K		60B8-103	
R59	130Ω5%	1	60B13-131	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	RATING SEC. 4	RATING SEC. 5	REPLACEMENT DATA ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T3	117V ② .60A	540 VCT ② .080A	5V ② 2A	6.3 VCT ② 1.5A			80C66-1 ①				PC8405		

① Alternate Part #80B66-1

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T4	8000Ω CT	3-4Ω	79D56-13	24S55	A-2904 ①	AU-609	A-3830	24S55	S-57Z	① Drill new mounting hole

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA ADMIRAL PART No.	QUAM PART No.	NOTES
SP5	12"	PM	3-4Ω	78B153-1	12A6A	
SP6	5 ¼"	PM	6-8Ω	78B150-2	52A21Z7.1	
SP7	4"	PM	6-8Ω	78B149-1	4A15Z7.4	
SP8	3½"	PM	4-6Ω	78B148-1	4A1TZ4.4	

MISCELLANEOUS

ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
M5	Switch	77A20-3	Play-Record (SPDT, Slide Type)
M6	Relay	83B22-1	Power, SPDT

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Bezel	23C313-9	Includes Control Plate, Models 622, 623, 624
Knob	33C254-11	Loudness, Selector, Bass, Treble, Models 622, 623, 624
Knob	33C254-13	Balance, Models SS622, SS623, SS624
Knob	33C254-14	Bass, Models SS622, SS623, SS624
Knob	33C254-15	Treble, Models SS622, SS623, SS624
Cabinet	35E458-2	Mahogany, Model 622
Cabinet	35E458-3	Blonde, Model 623
Cabinet	35E458-4	Sierra, Model 624
Cabinet	35E461-2	Mahogany, Model SS622
Cabinet	35E461-3	Blonde, Model SS623
Cabinet	35E461-4	Sierra, Model SS624
Legs	35E458-52	Mahogany, Model 622
Legs	35E458-53	Blonde, Model 623
Legs	35E458-54	Sierra, Model 624
Legs	37D168-2	Mahogany, Model SS622
Legs	37D168-3	Blonde, Model SS623
Legs	37D168-4	Sierra, Model SS624

WIRING DATA

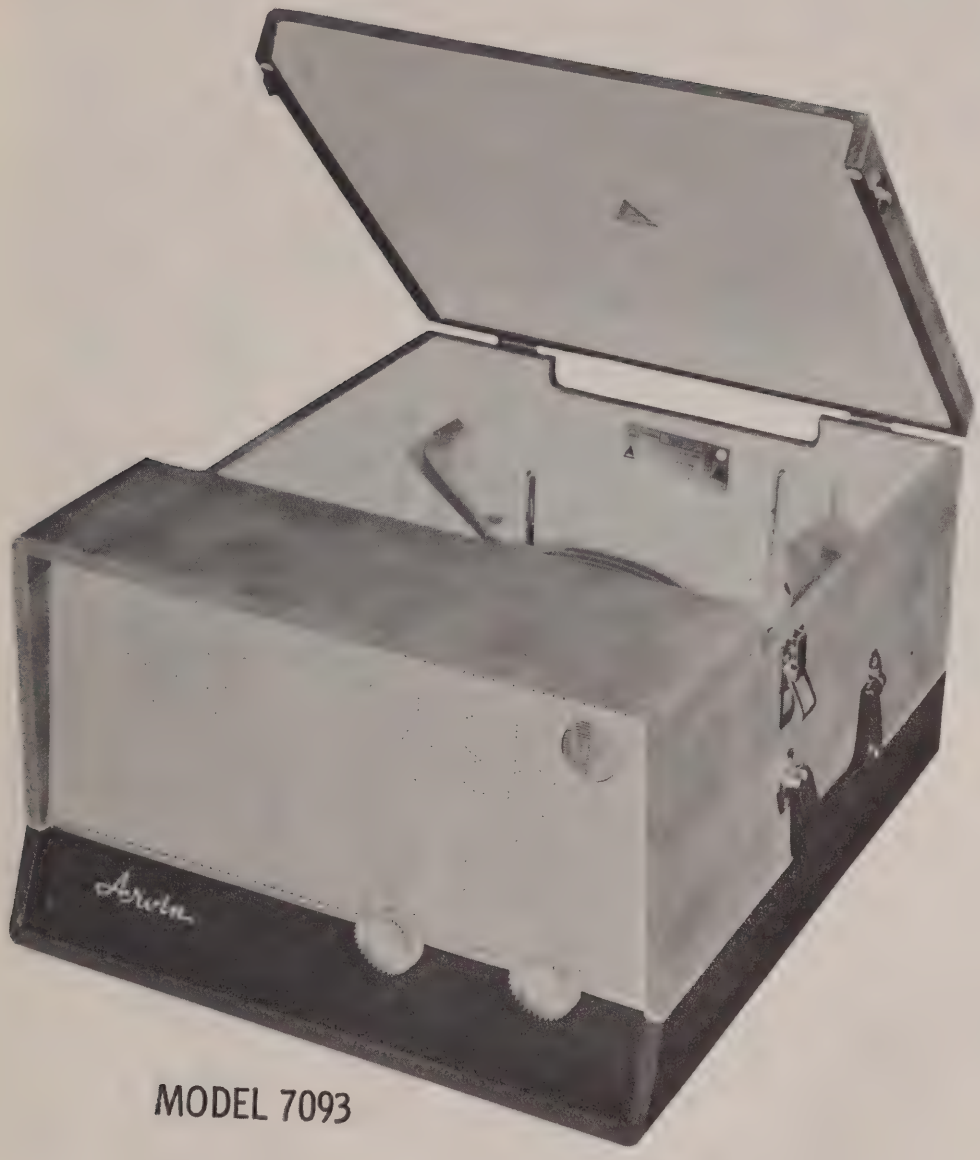
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT* Folder with CIRCUITRACE*

ARVIN MODELS 7093, 7094
(Ch. 11.46200, 11.46300)

ARVIN MODELS 7093, 7094
(Ch. 11.46200, 11.46300)



MODEL 7093

ARVIN MODELS 7093, 7094
(Ch. 11.46200, 11.46300)

TRADE NAME	Arvin Models 7093 (Ch. 11.46200), 7094 (Ch. 11.46300)
MANUFACTURER	Arvin Industries, Inc., Columbus, Indiana
TYPE SET	AC Operated 4 Tube Phono Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 31 Watts, .32 Amp. @117 Volts AC

FOR SERVICE INFORMATION ON RECORD CHANGER — SEE SIMILAR MONARCH UA8 — PHOTOFACT SET 381 FOLDER 11

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

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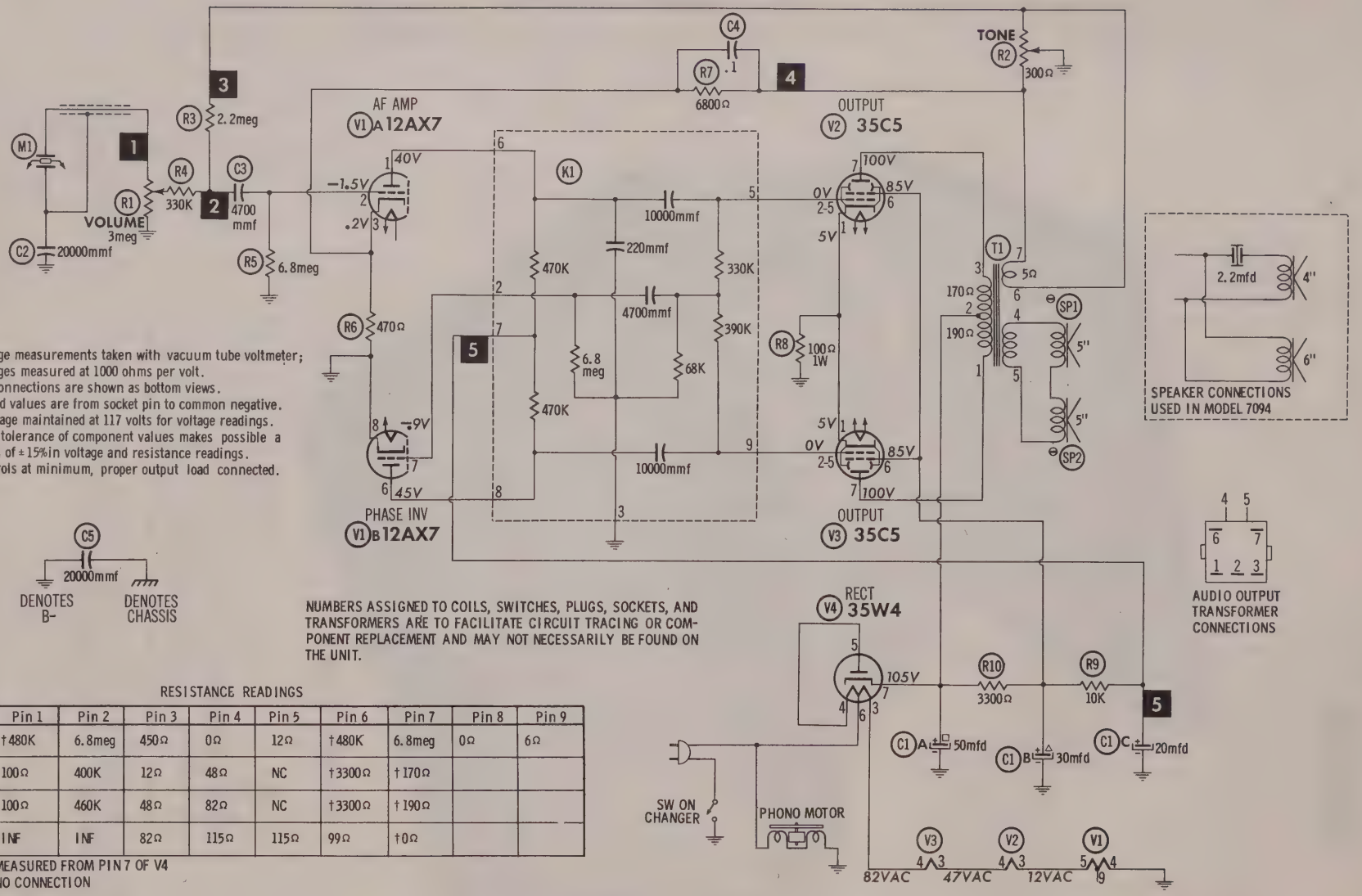

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†480K	6.8meg	450Ω	0Ω	12Ω	†480K	6.8meg	0Ω	6Ω
V2	35C5	100Ω	400K	12Ω	48Ω	NC	†3300Ω	†170Ω		
V3	35C5	100Ω	460K	48Ω	82Ω	NC	†3300Ω	†190Ω		
V4	35W4	INF	INF	82Ω	115Ω	115Ω	99Ω	†0Ω		

† MEASURED FROM PIN 7 OF V4
NC NO CONNECTION

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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ARVIN MODELS 7093, 7094 (Ch. 11.46200, 11.46300)

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amp. -Phase Inv.	12AX7	
V2	Output	35C5	
V3	Output	35C5	
V4	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ARVIN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■50	150	43711-3	AFH3-11-30	C0080 †	PFP311.63		PCL-3440.5	
B	▲30	150							
C	20	150							

† Use Adaptors 55277 & 55278

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	ARVIN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	20000				BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C3	4700				BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	
C4	.1	50			P2151N-1	DF-104	BC2P1J	ACE401	2SE-P10	
C5	20000				BPD-02	DD-203	BYB6S2	B-120	5HK-S2	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ARVIN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	3meg	½	45250-9	B-85	A47-3meg-Z	Q13-140	U57	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R2	300Ω	½	45250-8	B-4			TA52L	Tone

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		ARVIN PART No.	NOTES
	OHMS	WATT		
R3	2.2meg			
R4	330K			
R5	6.8meg			
R6	470Ω			

ITEM No.	RATING		ARVIN PART No.	NOTES
	OHMS	WATT		
R7	6800Ω			
R8	100Ω	1		
R9	10K			
R10	3300Ω			

PRINTED BOARD

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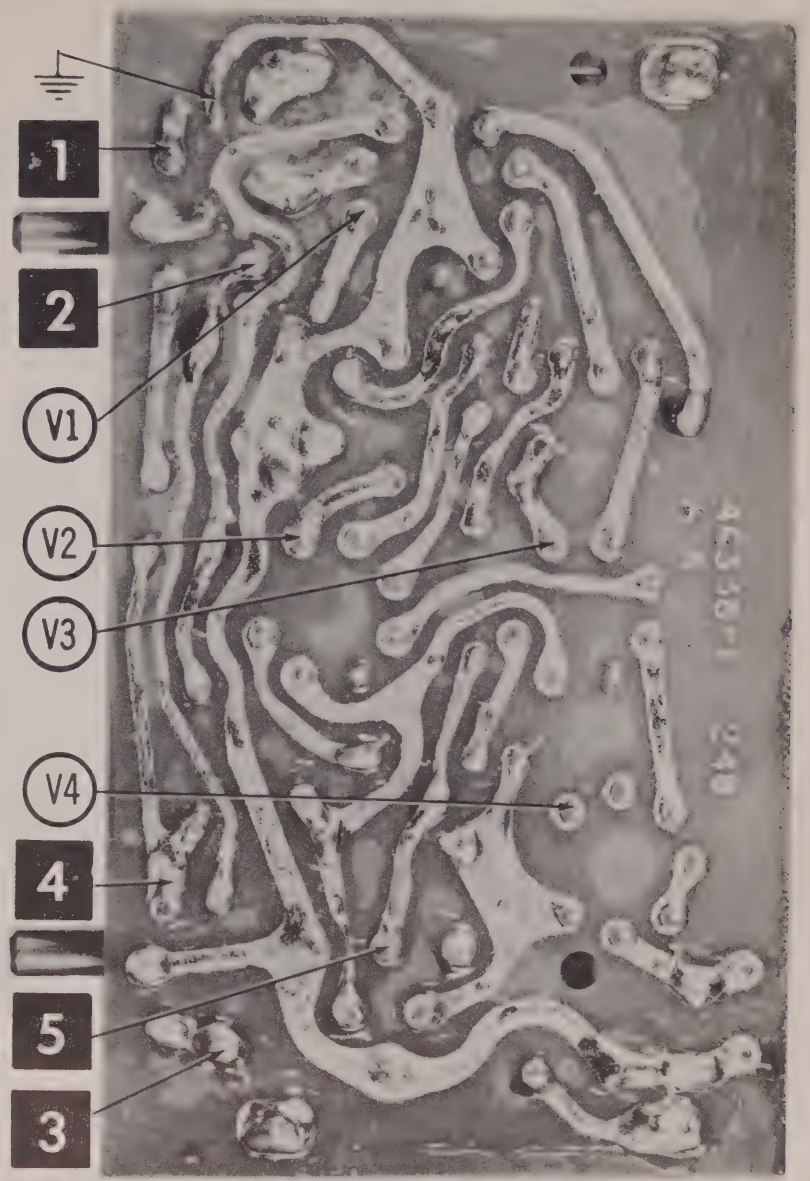
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



FOLDER 5

PARTS LIST AND DESCRIPTIONS (Continued)

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	ARVIN PART No.	REPLACEMENT DATA
K1	Audio Coupling	220mmf, 4700mmf, 10000mmf, 10000mmf, 68K, 330K, 390K, 470K, 6.8meg, 470K	46203	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.1	ARVIN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3100Ω CT	77Ω SEC.2 6-8Ω	46274-1							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ARVIN PART No.	QUAM PART No.	
SP1	5"	PM	3-4Ω	45599-5	4A07Z6.8	Model 7093
SP2	5"	PM	3-4Ω	45599-6	4A07Z6.8	Model 7093
	6"	PM	6-8Ω	46408-2		Model 7094
	4"	PM		46129	4A1TZ6.7	Model 7094

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	ARVIN PART No.	ASTATIC PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	46505-1 *	93-T *				* Includes needles

CABINETS & CABINET PARTS

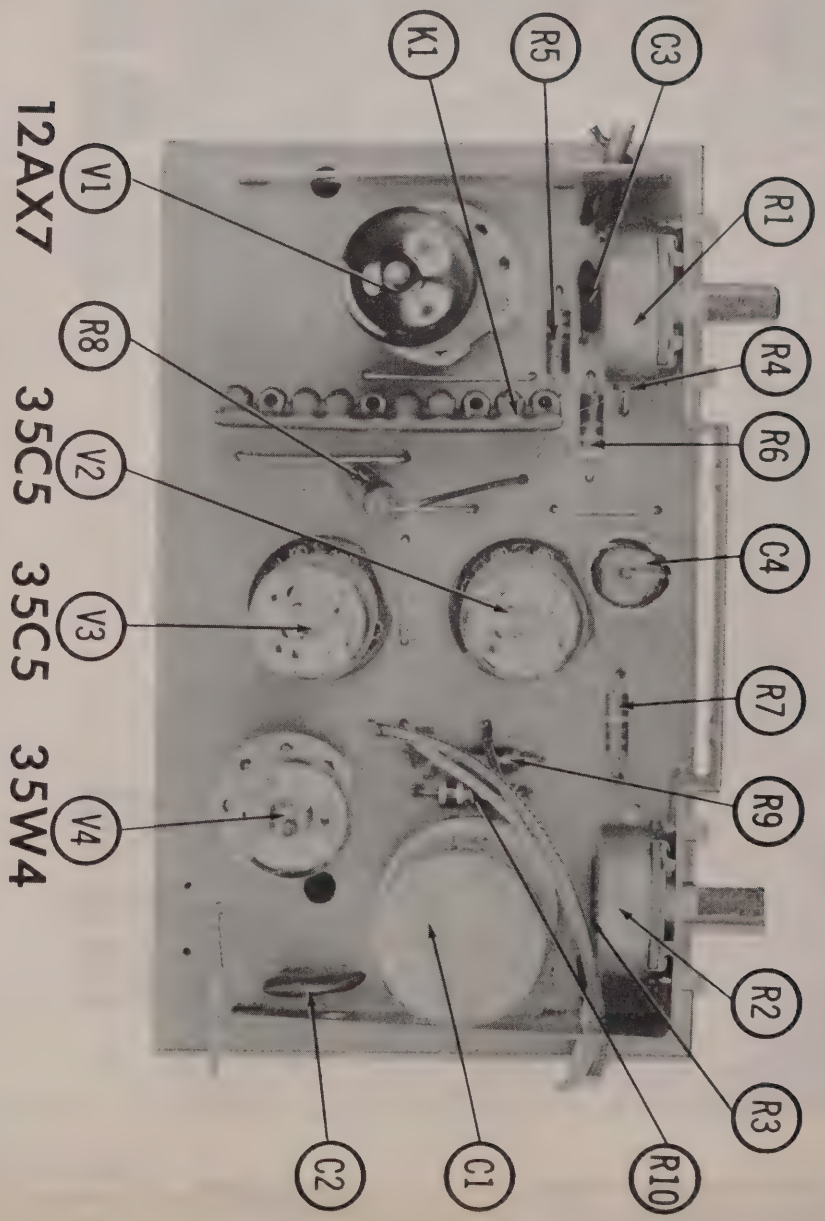
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	25929	Control, Model 7093
Knob	46402	Control, Model 7094
Cabinet	46132-65	Model 7093
Cabinet	46401-76	Model 7094

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS—TOP VIEW



PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

EICO MODEL HF-32

EICO MODEL HF-32

EICO MODEL HF-32

TRADE NAME	Eico Model HF-32
MANUFACTURER	Electronic Instrument Co., Inc., 3300 Northern Blvd., Long Island City 1, N.Y.
TYPE SET	AC Operated 10 Tube Audio Amplifier
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 135 Watts, 1.28 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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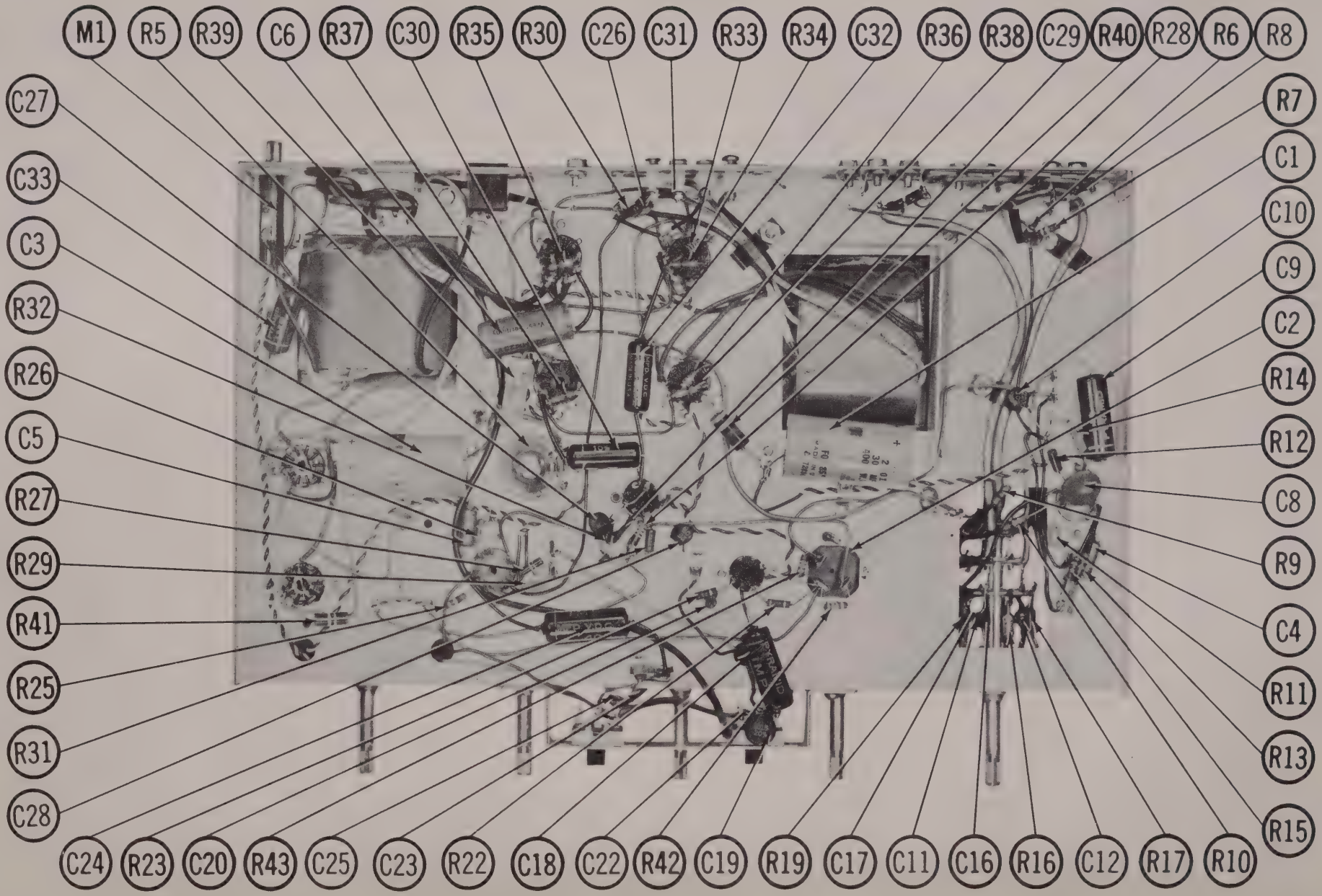


CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	Mic-Tape-Phono Preamp.	ECC83/12AX7
V2	AF Amp.	EC90/6C4
V3	AF Amp.	ECC83/12AX7
V4	AF Amp. -Phase Inv.	EC90/6C4
V5	Output	EL84/6BQ5

ITEM No.	USE	TYPE
V6	Output	EL84/6BQ5
V7	Output	EL84/6BQ5
V8	Output	EL84/6BQ5
V9	Rectifier	EZ81/6CA4
V10	Rectifier	EZ81/6CA4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	EICO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	30	400	23016	PRS450V30	BR3045	TC77	TD-30-450	TVA-1711	
C2A	▲20	400	24005	AFH3-43-50	C0340	FP376.9	TMT-39	TVL-3786	
B	■40	350							
C	▲40	350							
C3	30	400	23016 ①	PRS450V30	BR3045	TC77	TD-30-450	TVA-1711	
C4	10	6	23014	XPP-6010	NLW10-6	TT6X10	ML10-6	TE-1087	
C5	10	6	23014	XPP-6010	NLW10-6	TT6X10	ML10-6	TE-1087	
C6	300	25	23017	PRS25V250	BR2502	TC50025	TD-250-25	TVA-1208	

① Not used in some versions.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	EICO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C7	25000			22517	BPD-03	DF-303	BYB6S3			
C8	25000			22517	BPD-03	DF-303	BYB6S3			
C9	.1	400		20039	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C10	2200		10%	22507	DI-2200		PM6D22	JL-222	5BF-D22	
C11	500		10%	22515	DI-500	MD-501	PM6T5	MCB245	MS-35	
C12	3300		10%	22508	DI-3300		PM6D33	JL-233	5BF-D33	
C13	2200		10%	22507	DI-2200		PM6D22	JL-222	5BF-D22	
C14	.033	200	10%	20048	P288N-033		PM4S33	GEM-4133	4TM-S33	
C15	500		10%	22515	DI-500	MD-501	PM6T5	MCB245	MS-35	
C16	2700		10%	22518	DI-2700		1R5D27		5BF-D27	
C17	850		10%	22514	DI-1000			JL-382		
C18	.1	400		20039	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C19	15000			22547	BPD-015	DD16-153	BYA10S15		5GA-S15S *	
C20	1500		10%	22532	DI-1500		PM6D15	JL-215	5BF-D15	
C21	1500		10%	22532	DI-1500		PM6D15	JL-215	5BF-D15	
C22	1000		10%	22521	DI-1000		PM6D1	JL-210	5BF-D10	
C23	15000			22547	BPD-015	DD16-153	BYA10S15		5GA-S15S *	
C24	.1	400		20039	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C25	9000		10%	22548	1464-0091				5GA-D9S 10% *	
C26	100		10%	22509	DI-100	DD-101	L10T1	CNO-310	5GA-T1S 10% *	
C27	25		10%	22536	DI-25	DD-250	L10Q25	MCB220	MS-425	
C28	25		10%	22536	DI-25	DD-250	L10Q25	MCB220	MS-425	
C29	25		10%	22536	DI-25	DD-250	L10Q25	MCB220	MS-425	
C30	.022	600		20024	P688N-022	DD-203	CUB6S22	GEM-6122	6TM-S22	
C31	25		10%	22536	DI-25	DD-250	L10Q25	MCB220	MS-425	
C32	.022	600		20024	P688N-022	DD-203	CUB6S22	GEM-6122	6TM-S22	
C33	.03	600		20043	P688N-03	DF-303	CUB6S3	GEM-613	6TM-S3	

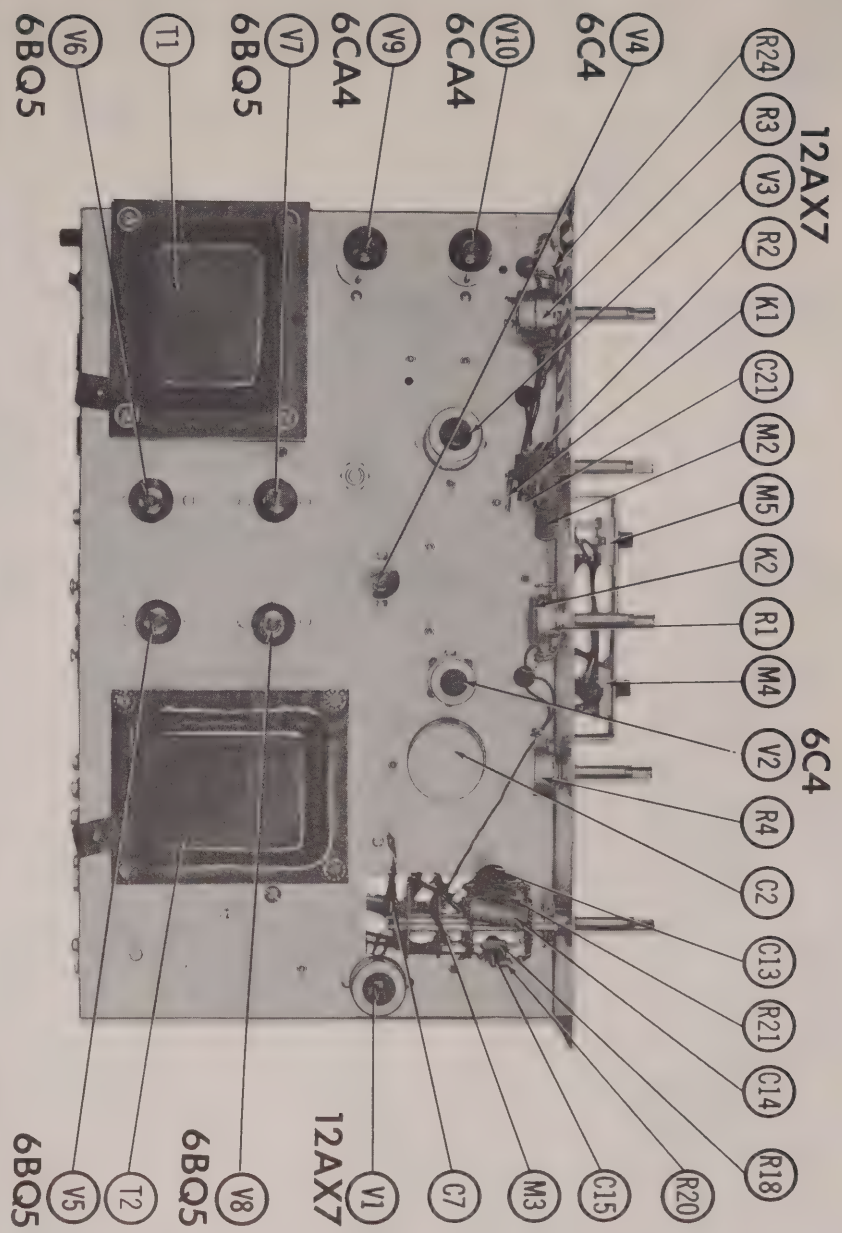
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	EICO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	500K	½	18039 ①	BT-160		Q18-133XX	UDT-283	Loudness, Taps @150K, 300K
R2A	1meg	½	18033	B-69	A47-1meg-S	Q11-137	U54	Bass
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R3A	500K	½	18034	BT-65	A47F5-500K	Q19-133X	UT-431	Treble, Tap @ 250K
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KR-1	SWE-12	76-1	US-26	Power On-Off
R4A	500K	½	18038	B-60	A47-500K-Z	Q13-133	U48	Level
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R5A	100Ω	2(WW)	19009	WN-101	A43-100	W11-084	R100L	Hum Adjust.
B	Shaft			Not Req.	FKS-1/4	SK5	Not Req.	

① Includes K2.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	EICO PART No.	NOTES
R6	150K		10435	
R7	150K		10435	
R8	220K		10417	
R9	1meg		10407	
R10	10K		10400	
R11	200K 5%		11526	
R12	1200Ω 5%		10427	
R13	1meg		10407	
R14	200K 5%		11526	
R15	4700Ω		10430	
R16	100K 5%		11527	
R17	560K 5%		11511	
R18	150K 5%		11525	
R19	100K 5%		11527	
R20	2.2meg 5%		11518	
R21	100K 5%		11527	
R22	47K		10428	
R23	5600Ω		10449	
R24	15K		10416	
R25	100K		10410	
R26	6800Ω		10421	
R27	10K		10400	
R28	330K		10412	
R29	1600Ω 5%		11542	
R30	33K 5%		11546	
R31	82K 5%		11547	
R32	82K 5%		11547	
R33	330K		10412	
R34	1000Ω		10432	
R35	1000Ω		10432	
R36	330K		10412	
R37	1000Ω		10432	
R38	1000Ω		10432	
R39	80Ω 5%	5		Note 1
R40	330Ω	2	10900	
R41	10K	1	10853	
R42	39K		10447	
R43	68K		10442	

Note 1. Not used in some versions.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	EICO PART No.	REPLACEMENT DATA
K1	Tone Comp.	330mmf, 4700mmf, 4700mmf, 1000Ω, 100K, 100K, 120K	29751	
K2	Loudness Coupling	100mmf, 200mmf, 4500mmf, 4500mmf, 50K, 50K	(Part of R1)	Centralab PC-324 Sprague TC-4

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA EICO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⓐ ⓐ1.275A	600VCT ⓐ.200A	6.3V ⓐ 1.8A	30021						
	SEC. 3	SEC. 4	SEC. 5							
	6.3V ⓐ 4.2A									

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA EICO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	4100Ω CT	16Ω Tap ⓐ 8Ω, 4Ω	32008							

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA EICO PART No. FUSE	EICO PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	3A 250V	91005	97800	312003. (3AG, 3A, 250V)	342001	AGC 3	HKP

MISCELLANEOUS

ITEM No.	PART NAME	EICO PART No.	NOTES
M2	Lamp	92000	#47
M3	Switch	60050	Selector (9 Position, Rotary Wafer Type)
M4	Switch	62000	Rumble Filter (DPDT, Slide type)
M5	Switch	62000	Scratch Filter (DPDT, Slide type)

CABINETS & CABINET PARTS

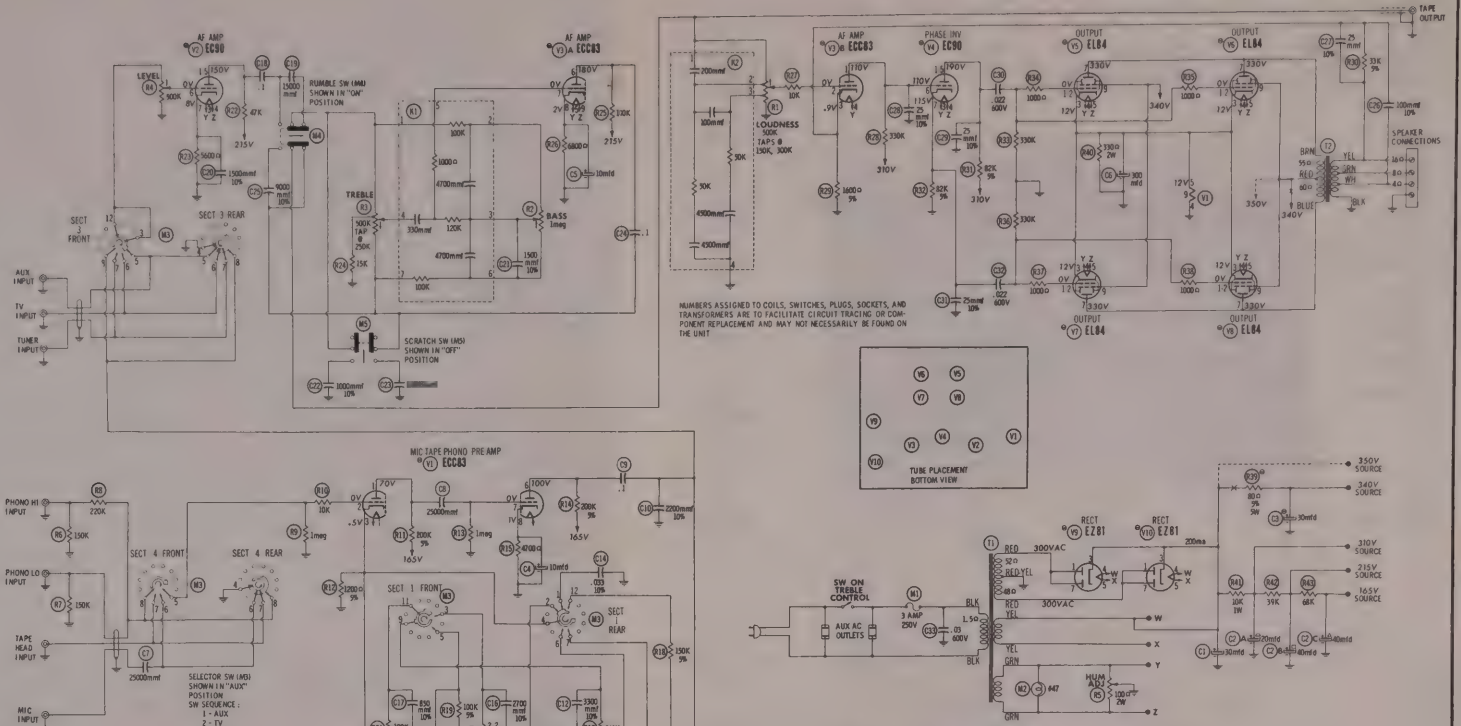
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Bezel	81116	Control, 5 used
Knob	53007	
Panel	80052	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83 12AX7	†320K	1meg	1200Ω	0Ω	12Ω	†320K	1meg	4700Ω	6Ω
V2	ECC90 6C4	†100K	NC	9Ω	9Ω	†100K	0Ω	5600Ω		
V3	ECC83 12AX7	†340K	10K.	1600Ω	9Ω	9Ω	†150K	320K	6800Ω	9Ω
V4	ECC90 6C4	†92K	TP	9Ω	9Ω	†92K	†340K	82K		
V5	EL84 6BQ5	330K	330K	12Ω	9Ω	9Ω	TP	†135Ω	NC	†8Ω
V6	EL84 6BQ5	330K	330K	12Ω	9Ω	9Ω	TP	†135Ω	NC	†8Ω
V7	EL84 6BQ5	330K	330K	12Ω	9Ω	9Ω	TP	†140Ω	NC	†8Ω
V8	EL84 6BQ5	330K	330K	12Ω	9Ω	9Ω	TP	†140Ω	NC	†8Ω
V9	EZ81 6CA4	52Ω	NC	†	†	†	NC	52Ω	NC	NC
V10	EZ81 6CA4	48Ω	NC	†	†	†	NC	48Ω	NC	NC

† THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
‡ MEASURED FROM PIN 3 OF V10.
NC NO CONNECTION
TP TIE POINT

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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BCO MODEL HF-32

PHOTOFACT* Folder

EKOTAPE MODEL
310 Series

EKOTAPE MODEL
310 Series

GENERAL INFORMATION

The Ekotape Model 310 is a twin-track recorder which will operate an automatic slide projector by means of a signal on the tape. The speech and/or music is recorded on the bottom half of the tape, and the signal for operating the projector is recorded on the top half. If no signal is desired, both halves may be used for regular monaural recording.

Two separate head assemblies are provided. The left assembly contains the erase and record-playback coils for the speech or music on the lower half of the recorded tape. The right assembly contains the erase and record-playback coils for the 1,000-cycle "Beep" control signal on the upper half of the recorded tape.

The recorder contains two separate amplifiers. One amplifies the record and playback operations for the speech or music; the other records and amplifies a 1,000-cycle control signal that triggers an automatic slide or strip film projector.

The Ekotape Model 310 has two speeds, 3 3/4 and 7 1/2 ips. An automatic stop switch stops the tape should it break or run out while the mechanism is in either the Rewind or the Forward position.

Manufactured by:

Electronic Division
Webster Electric
Racine, Wisconsin

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2. OPERATING INSTRUCTIONS

To Make a Recording

1. Plug power cord into receptacle on back of recorder and into 115-volt, 60-cycle AC power outlet.

2. Plug projector shift selector cord into receptacle on the side of the recorder. If plug furnished with projector does not fit receptacle, use adaptor plug (also furnished with recorder). Plug the projector power cord into a standard AC outlet.

3. Turn Tape Speed control to 3 3/4 or 7 1/2 ips, as desired. This also actuates the amplifier and motor. Tubes require approximately 30 seconds to warm up.

4. With Monomatic control in Stop position, put a full reel of tape on the left spindle and an empty reel on the right spindle. Unwind 14 to 16 inches of tape from the supply reel. Drop tape into tape slot, with the dull side facing you. Make sure the tape lies between guide and nylon insulator of automatic stop switch M10. Wind the tape around the hub of the take-up reel two or three times by hand, until all slack is taken up.

5. Insert plug on end of microphone cord into Input jack.

6. Turn Monomatic control from Stop to Forward position.

7. Depress and turn Record-Listen control to Record position. This control locks in the Record position as long as the Monomatic control remains in the Forward position. It returns to the Listen position automatically when the Monomatic control is turned from the Forward position. Warning light indicates that control is in Record position.

8. Turn Signal Record-Listen switch to Record position. This control also locks in the Record position until the Monomatic control is moved from the Forward position, at which time it returns automatically to the Listen position.

9. To stop the tape without resetting the Record-Listen, Volume, and Monomatic controls, insert the Manual Start-Stop control in the receptacle (at front of recorder) as far as it will go, and turn it a quarter-turn clockwise until it locks in place. This disengages the tape drive without turning off the motor or disturbing the other controls.

10. With tape stopped, start talking into the microphone. Adjust Volume control until recording-level meter M15 reads no more than 5.0 maximum sounds. A higher reading will result in distortion.

11. If the microphone is near the recorder, turn the Speaker On-Off control to the Off position in order to prevent feedback.

12. If recording several selections on one tape, set counter (63) at "000" before starting recording. At the start of each selection, mark the reading on the back of the tape box. The counter is geared so that a 7-inch reel of thin-base tape (1800 feet) takes one complete revolution of the numerals.

13. The microphone is very sensitive. Do not place it closer than three feet from the recorder loudspeaker while recording, unless speaker switch M9 is in the Off position. For best results, keep the microphone closer to the source of sound than to any walls in the recording area. This prevents the sound from rebounding off the walls and causing echoes.

14. With all controls set as outlined in the foregoing, release the Manual Start-Stop control by turning it a quarter-turn counterclockwise. Now start recording.

15. To apply a signal on the tape so that the projector can present the next slide, depress the Signal button. This button will not operate unless the Signal Record-Listen switch is in the Record position.

16. At the end of the recording, turn the Monomatic control to the Stop position. The Record-Listen control and Signal Record-Listen control will automatically move from the Record to the Listen position. This prevents accidental erasure of the tape.

NOTE: Speech and/or music can be recorded without signals by omitting Steps 2, 8, 15, and 16. This gives a standard monaural recording. The signal can be added later by following the foregoing instructions and omitting Steps 5, 7, 10, and 11.

To Make a Monaural Recording from a Radio or Record Player

1. A radio attachment cord (Accessory SS656) is necessary. Insert the plug on this cord into the Radio-Phono Input jack. Attach the two alligator clips to the voice-coil terminals of the radio or phonograph speaker.

2. Turn on the radio or phonograph. Adjust all recorder controls as outlined under "To Make a Recording". It is not necessary to operate the Speaker On/Off control, since no feedback occurs when a recording is being made in this manner.

To Erase a Recording

The speech and/or music channel is erased automatically when the Record-Listen control is in the Record position. The signal channel is erased automatically when the Signal Record-Listen control is in the Record position. Thus, both channels may be erased at the same time, or either channel may be erased without affecting the other. The old recording is erased a fraction of a second before a new one is put on the tape. To erase an old recording without putting a new one on the tape, operate the unit just as you do to make a recording, except turn the Volume control to the extreme counterclockwise position.

To Edit and Splice a Tape

NOTE: Since the unit is a twin-track recorder, editing is not possible when both tracks or signals have been recorded. Therefore, twin-track recordings can be edited only by erasing unwanted portions.

To eliminate unwanted material or to correct errors in a single-track recording, the tape is cut at the beginning and end of the portion to be removed. Cut the tape at a 45° angle. Butt the ends together and splice with a piece of splicing tape on the back, or shiny, side of tape. Trim edges of the splice slightly, to prevent any interference as the tape moves through the tape slot.

To Play a Recorded Tape

1. After a tape has been recorded, turn Monomatic control to Rewind position. This returns tape to left (supply) reel. When rewinding is completed, turn Monomatic control to Stop position. Allow tape to stop completely.

2. Be sure Speaker On-Off control is On

3. Move Monomatic control to Forward position. Turn Volume control to the desired level.

4. Adjust Tone Control to give the most pleasing balance of bass-treble. Turning this control clockwise increases the treble response; counterclockwise, the bass response. In the midway position, response is termed normal, or flat.

5. An external speaker can be connected if a radio attachment cord (SS656) is used. Insert the plug on this cord into the Output Jack, and attach the clips to the external speaker terminals. Inserting plug all the way into the jack cuts out the internal speaker; inserting plug halfway into the jack permits both the internal and the external speakers to operate at the same time.

6. When the projector is connected as described in Step 2 of "To Make a Recording", the sound-slide presentation will be fully synchronized.

7. The recorder is equipped with a tape-out or automatic stop (46), which shuts off the motor when the tape has run out in the Forward or the Rewind position.

NOTE: To prevent flat spots on the drive mechanism, the Monomatic control should be returned to the Stop position after automatic stop (46) has operated. Never store the unit with the Monomatic control in the Forward or Rewind position for the same reason.

To Use Recorder as a Public Address System

Plug the microphone into the Input jack. Leave the Monomatic control in the Stop position. Depress and turn the Record-Listen control to the Record position. Adjust the Volume control for the desired sound level from the speaker. An external speaker can also be used if the procedure is followed which is described under "To Play a Recorder Tape".

3. DESCRIPTION

The Ekotape Model 310 recorder may be used as strictly a conventional monaural record-playback unit, or it may be used with an automatic slide or film projector for a synchronized sound-slide presentation. The system used to trigger the slide projector completely eliminates the need for a "bell," "beep" tone, or other distracting audible signals, or for the manual thumb-switch slide selector. The Model 310 provides up to an hour (7" reel) of uninterrupted continuity. automatically synchronized with the slides by a 1,000-cycle control signal recorded on half of the tape as the continuity is recorded on the other half. A special amplifier converts the control signal into electrical energy to operate the automatic projector.

The Model 310 also eliminates the unchangeable "canned" presentations, since tapes can be erased and rerecorded, or cut and spliced to correspond to changes in slides or slide sequence.

The theory of operation on the control signal amplifier is as follows (refer to schematic diagram Page 21).

When a previously recorded signal is played back, a signal travels from the play-record coil, through the Play-Record interlock switch (M14), to grid, pin 7, of V8A 1/2. The signal is amplified by tube (V8) and fed through the "Beep" signal Play-Record switch (M15) to grid, pin 1, of V9. This AC signal drives tube (V9) into heavier conduction, causing relay (M16) to close, thereby shorting out receptacle(to projector) and triggering the slide projector into operation.

The Model 310 is housed in a luggage-type portable case with a leather carrying handle.

Several of the outstanding features incorporated in the Model 310 are:

a. Power Off-on switch is actuated by the speed control knob. When the power is turned off, the idler assemblies that control the 3 3/4 or 7 1/2 ips tape speeds are automatically disengaged, preventing the formation of flat spots on the drive surfaces. Furthermore, the Off position is reached each time a different speed selection is made. This feature momentarily interrupts the power to the recorder and stops all moving parts before a new tape speed is selected, thus preventing wear on the rubber idlers due to excessive slippage. Tape speed selection automatically switches the speed equalization networks.

b. Internal or external speaker is automatically silenced in "Fast Forward" and "Rewind" positions through a muting switch.

c. The unit is equipped with the following: control knob for remote starting and stopping of the mechanism; program selection finder for quick location of a previously recorded selection on tape; VU recording level meter; automatic tape-off switch.

d. Special interlocking device returns both the continuity and control signal circuit Record-Listen switches from Record to Listen position whenever the

Monomatic control knob is switched to a different position. This safety feature prevents accidental erasure. A glow from the warning light indicates that the continuity Record-Listen switch is in the record position.

4. TROUBLESHOOTING

Although this recorder is designed to have a long service life, after prolonged use or misuse, certain troubles may arise. The following trouble charts were compiled to aid in locating malfunctions in the shortest possible time. Before disassembling the units and performing point-to-point tests, connect to the power source and check for the mode of operation in which trouble occurs. Then refer to the trouble chart to locate the probable cause and the remedy for the trouble. First, perform the checks which do not require disassembly of units or components. The mechanism and continuity amplifier assembly can be removed from the case as a unit (refer to "Disassembly Instructions") and the operation observed, but be sure the speaker is connected to the amplifier. Turn the unit "on" and check that power is being supplied, and that the tubes light up. Test tubes that do not light up, and check for broken connections, loose levers, and cams.

For quick location of parts, as mentioned in Trouble Charts below, to their respective reference numbers (given in parenthesis), refer to schematics, photos and exploded views.

TROUBLE CHART -- MECHANISM AND CONTINUITY AMPLIFIER ASS'Y.

TROUBLE	CAUSE	REMEDY
Power Off-on switch (M11 or item 54) turned "on", but motor (137) and amplifier inoperative.	Power supply defect.	Check voltage and resistance readings on schematic diagram.
	Damaged power cord.	Repair or replace.
	Broken or defective power switch.	Replace.
Tubes light and amplifier functioning; motor (137) inoperative.	"Tape-off" switch (M10 or item 46).	Check that control knob (2) is in "Stop" position.
No sound or sound is fuzzy, faint, or distorted.	Over-recorded or under-recorded tape.	See Operating Instructions for proper operation.
	Amplifier trouble.	See paragraph 5c (page 9). Check voltages and resistances as designated on schematic diagram. (Page 18)
	No bias current.	Oscillator tube (V6) defective. Open bias oscillator circuit. Loose connections to record head. Bad oscillator coil (L1). Replace C21.
	Pressure pads not operating properly.	See paragraph 10 (page 14).
	Dirty head (44).	Clean. Do not remove or change position of head (See pars. 5b & 6, pages 9 & 12).
	Worn or dirty pressure pads.	Clean or replace. (See paragraph 10, page 14.)
	Record head coil inoperative.	Check oscillator bias voltage and head coil continuity. (See paragraph 9, page 13.)
No sound but motor operates and tubes light.	Amplifier trouble.	See paragraph 5c (page 9). Check voltages and resistances as designated on schematic diagram. (Page 18)

TROUBLE CHART--MECHANISM AND CONTINUITY AMPLIFIER ASS'Y. (CONT.)

TROUBLE	CAUSE	REMEDY
Erase incomplete or no erase.	Dirty head (44).	Clean. (See pars. 5b & 6, pages 9 & 12.)
	Oscillator not operating.	Check voltage from oscillator coil (L1) tap (terminal 2) to ground with an AC vacuum tube voltmeter. Should read at least 45 VAC.
	Damaged erase coil.	Check continuity.
	Pressure pads worn, damaged, or out of adjustment.	Adjust or replace. (See paragraph 10, page 14.)
Does not record. Record warning indicator glows.	Faulty microphone or cord.	Replace.
	Faulty input jack	Check and replace.
	Faulty tube.	Check tubes V2, V3, V4, & V7.
	Open capacitor (C18).	Replace.
	Dirty head (44).	Clean.
	Pressure pads worn, aged, or out of adjustment.	Adjust or replace. (See paragraph 10, page 14.)
	Open play-record coil.	Check continuity.
Record warning neon indicator does not glow with mechanism in record position. Machine records properly.	Bad neon bulb	Replace.
	Open resistor (R36).	Replace.
No playback; amplifier hiss only.	Open play-record coil.	Check continuity.
	Open input circuit.	Check selector switch (M5).
	Bad selenium rectifier (M1).	Replace.
	Faulty tube.	Check V1.
Howl or ringing sound during playback.	Microphonic tube.	Replace defective tube.
	Acoustical feedback when recorded.	Erase tape and re-record with speaker "off", or move microphone away from speaker.
Poor high frequency response.	Bad component in equalization network.	Check and replace defective components in equalization circuitry.
	Dirty head (44).	Clean. (See pars. 5b & 6, pages 9 & 12.)
	Pressure pads worn, damaged or out of adjustment.	Adjust or replace. (See paragraph 10, page 14.)
Loud hum on playback.	Bad tone control.	Replace control. (See paragraph 5c, page 9.)
	Bad 5879 (V1) tube.	Replace.
	Leaky capacitor (C3).	Replace.
	Open power supply filter capacitor (C1) or (C2).	Check and replace.

TROUBLE CHART--MECHANISM AND CONTINUITY AMPLIFIER ASS'Y. (CONT.)

TROUBLE	CAUSE	REMEDY
Recording unintelligible on playback.	Improper record bias.	Check oscillator circuit components. Replace bad parts.
	Pressure pads worn, damaged, or out of adjustment.	Adjust or replace. (See paragraph 10, page 14.)
	Malfunction in playback pre-amplifier circuit.	Check circuit components & (V1). Replace defective parts.
Distorted bass response.	Bad component in equalization network.	Check and replace defective components in tone control circuitry.
	Defective 6BQ5 (V4 & V5) output tubes.	Check and replace if necessary.
	Dirty head (44).	Clean. (See pars. 5b & 6, pages 9 & 12.)
Output muffled or low.	Dirty head (44).	Clean. (See pars. 5b & 6, pages 9 & 12.)
	Weak amplifier tube.	Check tubes and replace as required.
	Bad microphone or cable.	Check, repair, or replace.
Tape overruns from "Rewind" to "Stop".	Damaged, worn, or improperly adjusted take-up reel brake (71).	Check brakes. Repair, replace, or adjust. (See paragraph 13a, page 14.)
Tape overruns from "Fast Forward" to "Forward".	Worn, damaged, or improperly adjusted supply reel brake.	Check brakes. Repair, replace, or adjust. (See paragraph 13b, page 14.)
"Take-up" or "Fast Forward" inoperative, noisy, or irregular.	Worn or improperly adjusted clutch (106).	Repair, replace, or adjust. (See paragraph 14, page 14.)
	Brake dragging on supply reel.	Adjust brakes. (See paragraph 13a, page 14.)
	Take-up reel support (80) dirty or damaged.	Clean, lubricate, or replace as necessary.
	Worn or damaged idler (117).	Replace. (See paragraph 14c, page 15.)
	Take-up reel support plate spring (79) broken.	Replace. (See Fig. 6, page 13.)
Noisy operation in "Stop" and "Forward" positions.	Worn or damaged idlers (91), (94), (117), or dry bearings.	Repair, replace or lubricate.
	Damaged idler link (113).	Repair.
Tape flares out on supply reel when engaging remote lever assembly.	Worn or damaged supply reel brake, or broken spring (72).	Replace. (See paragraph 13, page 14.)
Remote lever assembly not functioning properly.	Broken return spring (70) or dirty lever assembly (69).	Replace spring (70). (See paragraph 15, page 15.) Lubricate lever (69).
	Pinch roller (28) does not disengage capstan.	Adjust lever assembly (69). (See paragraph 15, page 15.)
Inoperative control knob.	Loose knob set screw (4).	Tighten.
	Loose set screw (24) in cam & plate assembly (23).	Adjust cam (23) to proper position and tighten.
Speed selector not functioning properly.	Broken springs (87 or 95) on drive idler assemblies.	Replace. (See paragraph 16a, page 15.)

TROUBLE CHART--MECHANISM AND CONTINUITY AMPLIFIER ASS'Y. (CONT.)

TROUBLE	CAUSE	REMEDY
Unit inoperative when control knob is operated.	Loose control cam (23A).	Adjust and tighten.
	Damaged or worn cam (23A) or shaft and gear (19) assembly.	Replace.
Poor equalization in either or both speeds.	Switch cam assembly (53) loose.	Adjust. (See paragraph 16b, page 15.)
	Bad equalization switch (M6 or M7).	Replace. (See paragraph 16b, page 15.)
	Bad equalization circuit component.	Replace defective component.
Counter inoperative.	Broken belt (102).	Replace belt (102).
Pilot light out, all other operation normal.	Bad pilot light.	Replace pilot light.
"Monkey Chatter" in "Fast Forward" or "Rewind" positions.	Bad muting switch (M8).	Replace.
	Muting switch (M8) tab bent.	Adjust.
"Wow" during operation of recorder.	Dragging brake.	Check brake and correct if bad.
	Clutch (106) too tight.	Adjust.
	Oil on drive surface.	Check drive surface and clean per paragraph 6, page 12.
"Flutter" during operation of recorder.	Dirty head (44), pressure pads, flywheel and shaft assembly, or pinch roller (28).	Clean per paragraph 6, page 12.
"Tape-off" switch (M10) functions improperly.	Mal-adjustment.	See paragraph 17, (page 15).
	Dirty slide lever (51).	See paragraph 7b, (page 12).
	Improper action between function cam (23), kickout lever (41), and slide lever (51).	Check for proper operation.
	Broken spring (52).	Replace.

TROUBLE CHART--"BEEP" AMPLIFIER ASS'Y.

TROUBLE	CAUSE	REMEDY
No visual signs of power being supplied. Off-on switch on mechanism assembly turned "on". Continuity amplifier assembly functions properly.	Power supply defect.	Check AC outlet on continuity amplifier chassis. Check power plug on "Beep" signal amplifier. (See paragraph 5d, page 9).
1,000-cycle signal is recorded, but playback function is dead.	Faulty connection or bad switch contact.	Check switch (M14) and (M15) for proper contact. Check connections of input circuit. Check to see that Record-Listen knob (3A) returns to the Listen position when Monomatic control (2) is turned to a different function. (See paragraph 3d, page 3.)

TROUBLE CHART--"BEEP" AMPLIFIER ASS'Y. (CONT.)

TROUBLE	CAUSE	REMEDY
1,000-cycle pre-recorded signal plays back, but record function is dead.	Faulty connection or bad switch contact.	Check to see that switch (M14) engages record position. Check switch (M15) for proper contact.
	Defective oscillator circuit.	Check associated components in oscillator circuit. Replace defective parts.
	Faulty tube.	Replace (V8).
	Open resistor (R38)	Replace.
No record or playback of 1,000-cycle signal.	Amplifier trouble.	See paragraph 5d (page 9). Check voltage and resistance readings on schematic diagram (Page 21).
	Open play-record coil in head assembly (44A).	Replace head (44A). (See paragraph 9, page 13).
	Dirty head (44A).	Clean. Do not remove or change position of head. (See paragraphs 5b and 6, page 9 & 12.)
	Pressure pad worn, aged, or out of adjustment.	Adjust or replace. (See paragraph 10, page 14.)
1,000-cycle signal distorted due to hum.	Open power supply filter input capacitor (C26A).	Replace capacitor (C26).
	Open input circuit.	Check shielded lead and shield cable from head assembly (44A) for break or disconnection. Check shielded lead and shield cable from switch (M14) to input plug for break or disconnection.
Record and playback operation of 1,000-cycle signal normal; but fails to operate slide projector.	Defective tube (V9).	Replace.
	Bad relay (M16).	Check continuity.
	Poor connection between receptacle and projector.	Check connection.
	Insufficient stand-by current.	Adjust control (R37). (See paragraph 9c, page 13 and schematic diagram (Page 21).
1,000-cycle signal cannot be erased from tape.	Erase section of head (44A) disconnected.	Check connections.
	Open erase coil in head assembly (44A).	Replace head (44A). (See paragraph 9, page 13.)
	DC erase current insufficient.	Weak V10.

5. DISASSEMBLY INSTRUCTIONS

All service work will require removal of the units from the carrying case with the following exceptions:

Cleaning and aligning of the head assemblies (44 & 44A), cleaning, adjustment or replacement of the brake lever assemblies (71 & 73), remote lever assembly (69), pinch roller and lever assemblies (32), and the pressure pad assembly (38).

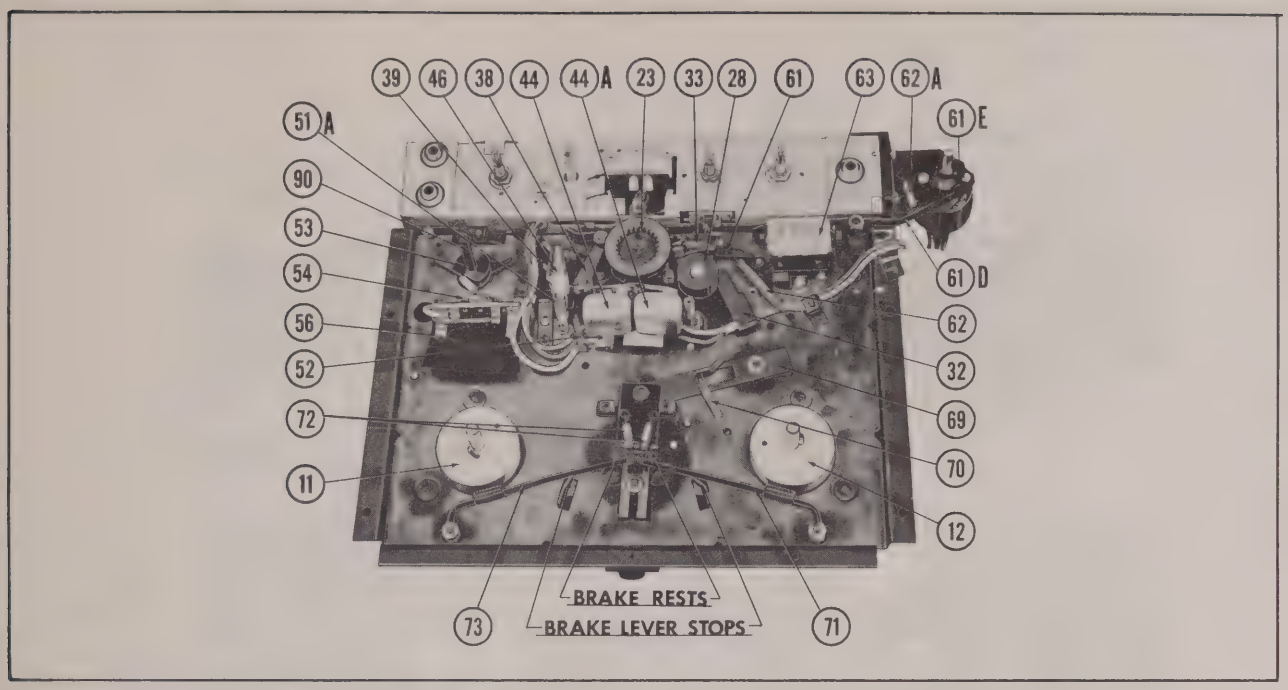


Fig. 1. Top View of Tape Transport Mechanism With Top Panel (6), Screen Panel Assembly (14), and Bracket and Bushing Assembly (17) Removed

a. Refer to Exploded View, Figures 2 & 3 on pages 10 & 11, for location of parts to their respective reference numbers. Remove head cover (10) by removing screw (9).

b. For cleaning of the head assemblies (44 & 44A) and inspection of the pressure pad (38) and muting switch cam assemblies, remove top panel assembly (6) in the following manner:

1. Remove four Phillips head screws (7), their respective washers (8), and Phillips head screw (7A).

2. Loosen set screw (4) on control knobs (2) and (3). Remove control knobs (2) and (3). Loosen set screw (4A) on control knob (3A) and remove knob (3A).

3. Remove control knobs (1) by pulling "up".

4. Loosen Phillips head screw (3B) from knob (3C). Remove knob (3C) and spring (3D).

5. Lift top panel assembly (6).

c. To remove tape transport mechanism and continuity amplifier assembly from case proceed as follows:

NOTE: To service continuity amplifier chassis tubes, remove six Phillips head screws from tube access metal plate on bottom of carrying case.

1. Remove seven Phillips head screws (15) and their respective washers (16) from screen panel assembly (14). Slide screen panel assembly upward to remove from its retaining grooves.

2. Disconnect input plug from "Beep" amplifier chassis.

3. Disconnect "Beep" amplifier power plug from continuity amplifier chassis AC outlet

4. Remove interconnecting ground lead between amplifier assemblies by removing screw near External Speaker Jack.

5. Turn carrying case on its baggage studs (being careful not to damage exposed speaker cones) and partially remove the unit from the case. After partial movement disconnect the speaker plug from amplifier chassis, and then proceed to remove unit completely from case.

6. To gain access to the internal wiring and components of the amplifier, remove two Phillips head screws from chassis bottom cover and remove bottom cover.

d. To remove "Beep" amplifier chassis:

NOTE: Mechanism and continuity amplifier assembly must be removed before attempting to remove the "Beep" amplifier.

1. Remove tubes (V8), (V9), and (V10) from chassis.

NOTE: Removal of the mechanism and continuity amplifier assembly or "Beep" signal chassis is unnecessary in order to service the tubes on the "Beep" signal chassis.

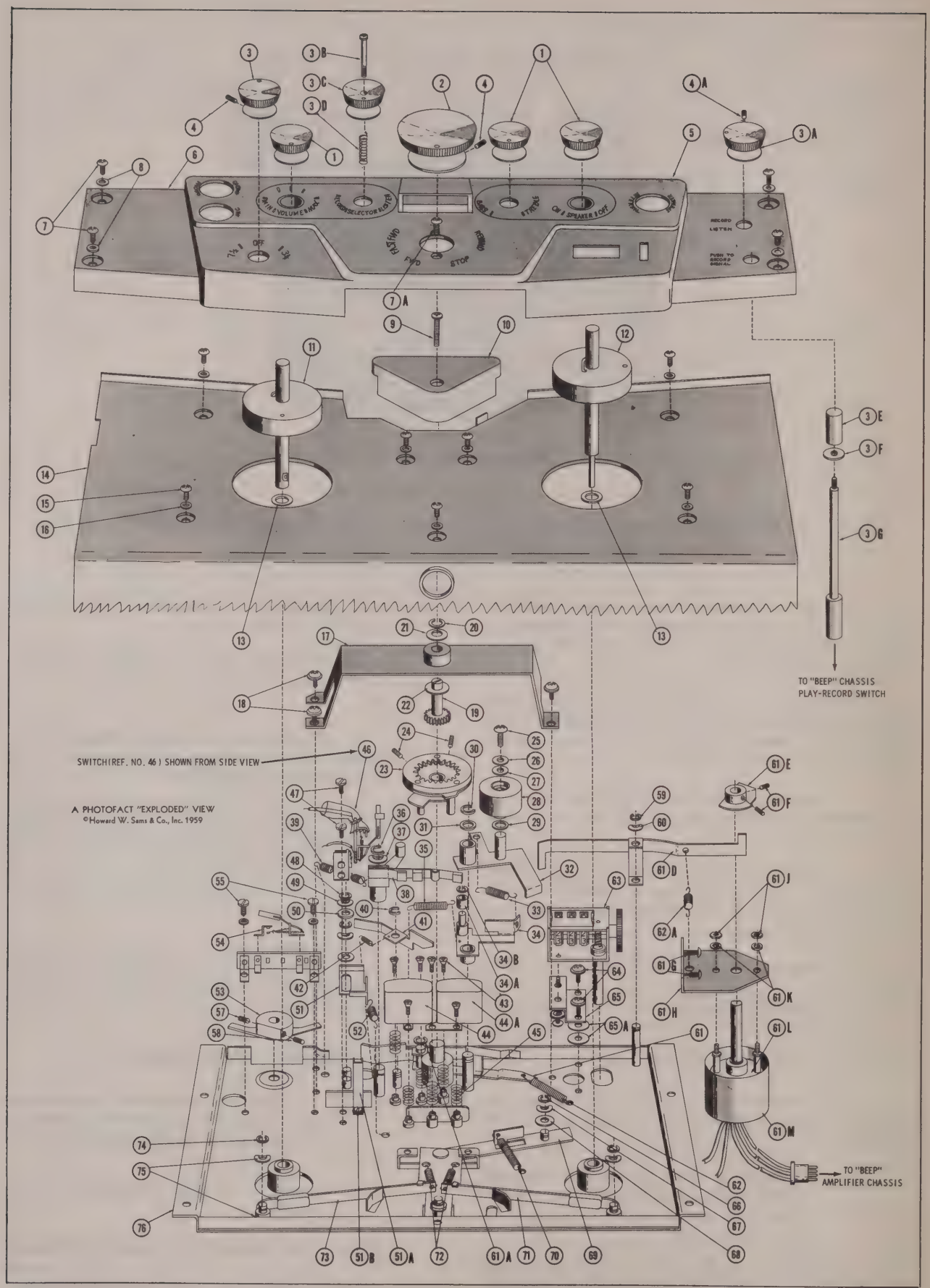

SWITCH (REF. NO. 46) SHOWN FROM SIDE VIEW
A PHOTOFACT "EXPLODED" VIEW
©Howard W. Sams & Co., Inc. 1959
TO "BEEP" CHASSIS PLAY-RECORD SWITCH
TO "BEEP" AMPLIFIER CHASSIS

Fig. 2. Exploded View of Parts Above Mechanism Plate

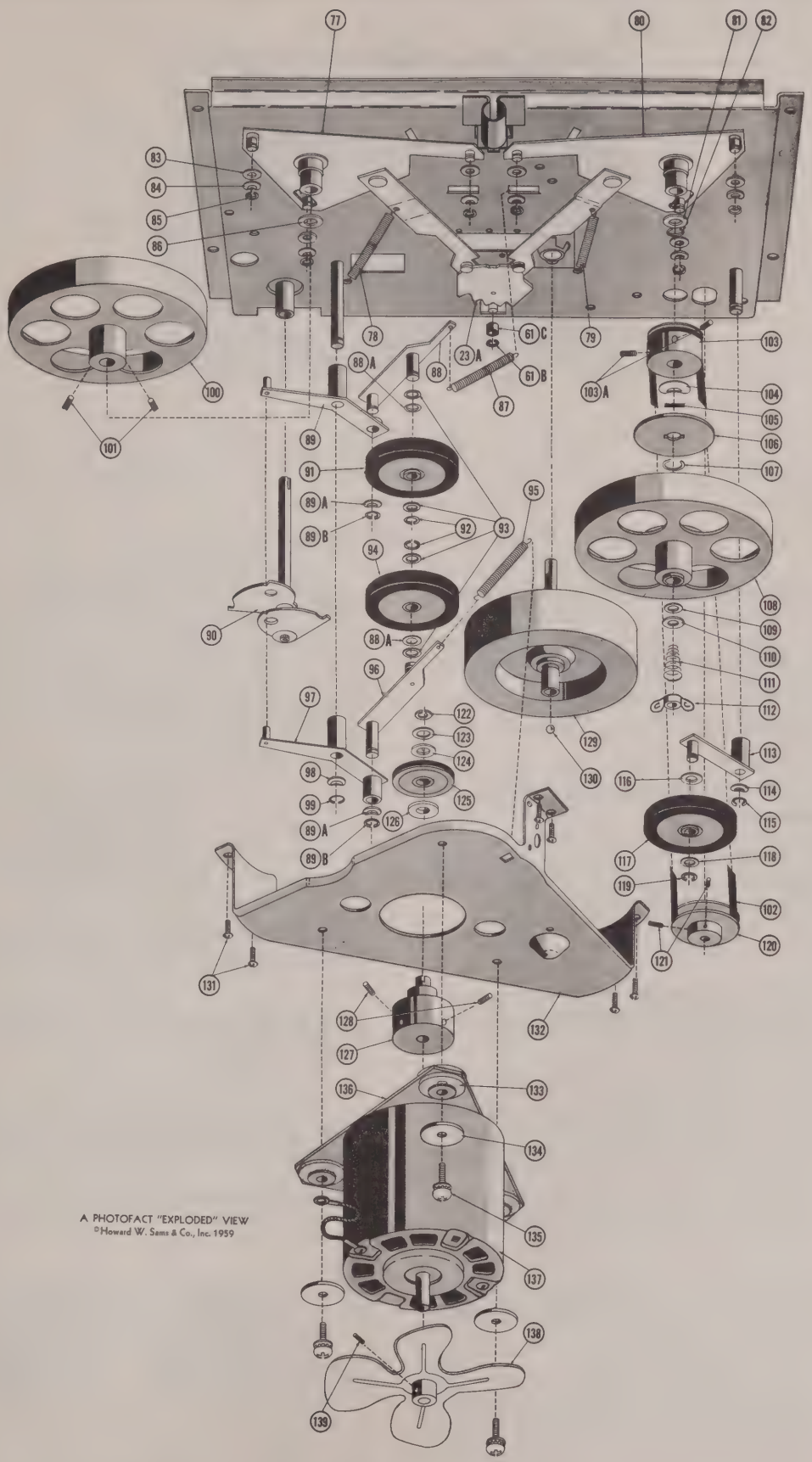


Fig. 3. Exploded View of Parts Below Mechanism Plate

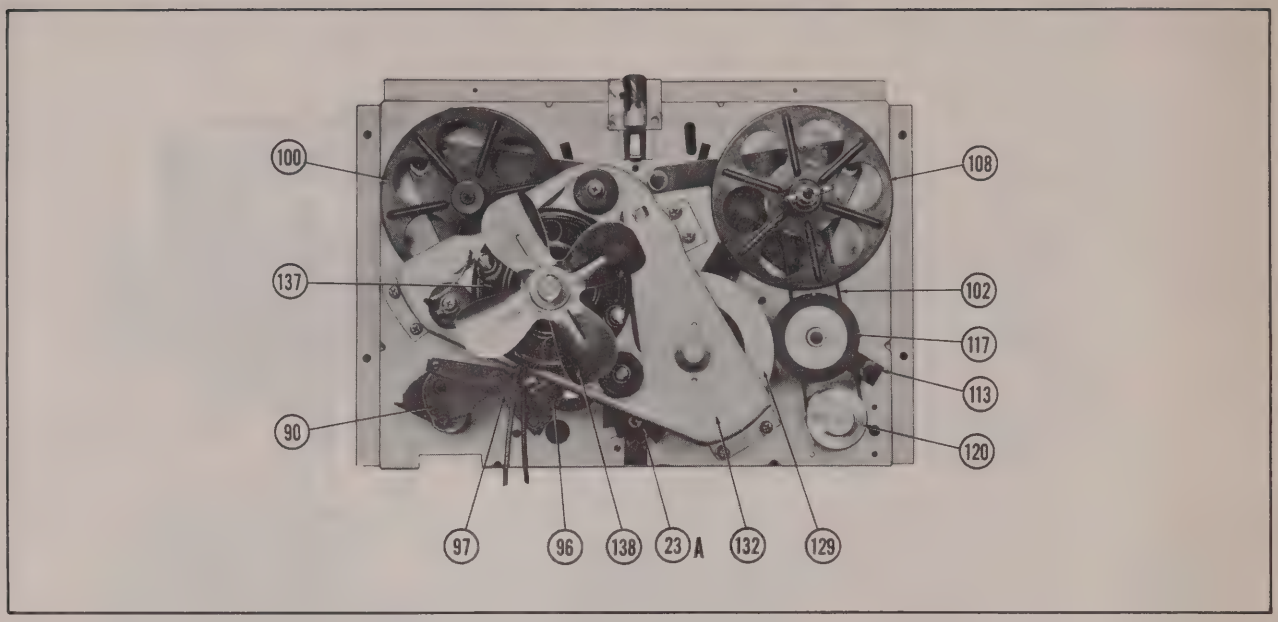


Fig. 4. Bottom View of Tape Transport Mechanism

2. Remove two Phillips head machine screws and cup washers from right side of case near carrying handle. Remove one Phillips head machine screw and cup washer from bottom of carrying case.

3. Remove "Beep" signal chassis from carrying case.

e. After servicing the units, inspect visually for signs of damage and wear, and make certain all parts are in their proper place and properly adjusted. Reassemble by reversing the procedures outlined above. When returning the units to the case be sure that speaker leads will be clear of all moving parts.

6. CLEANING

When improper operation of the unit calls for cleaning as indicated by the Trouble Chart, follow the procedures outlined below:

a. When trouble is caused by dirt on head assemblies (44 or 44A), clean head with a soft, dry cloth. If dirt is thick and caked on head, moisten the cloth with alcohol or another suitable solvent, and rub gently until the dirt is removed.

NOTE: Do not use a brush or an excessive amount of solvent to clean the head.

b. The flywheel and shaft assembly (129) and pinch roller assembly (28) may be cleaned in the same manner as described in "a" above.

c. If pressure pad assembly (38) has dirt on the pads, brush lightly with a stiff fibre brush. If caked with dirt, worn, or hard, replace the assembly.

7. LUBRICATION

GREASE SHALL BE APPLIED SPARINGLY. Only a thin film of grease is required in all cases. Remove dirty and excessive grease with alcohol or another suitable solvent before relubrication.

a. Oilite bearings are pre-lubricated for the life of the bearing. All that is necessary is light wiping with a clean rag. No further lubrication of the bearings is required.

CAUTION: Never use a cleaning solvent on oilite bearings. Any excess oil may run off the bearings and work its way onto the rubber driving surfaces, causing unsatisfactory operation of the mechanism.

b. Lubricate all cams, levers and sliding parts with a thin film of Liqui -- Moly NV Grease.

8. TESTING, ADJUSTMENTS, REPAIR, AND REMOVAL

Use the procedures to follow to bring the equipment to peak operating efficiency after repair and overhaul or during troubleshooting services.

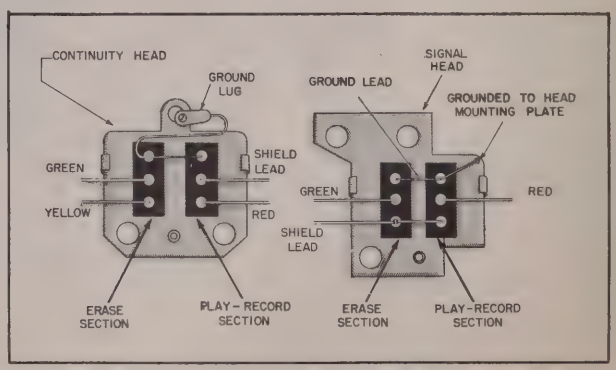


Fig. 5. Head Assembly Bottom Views

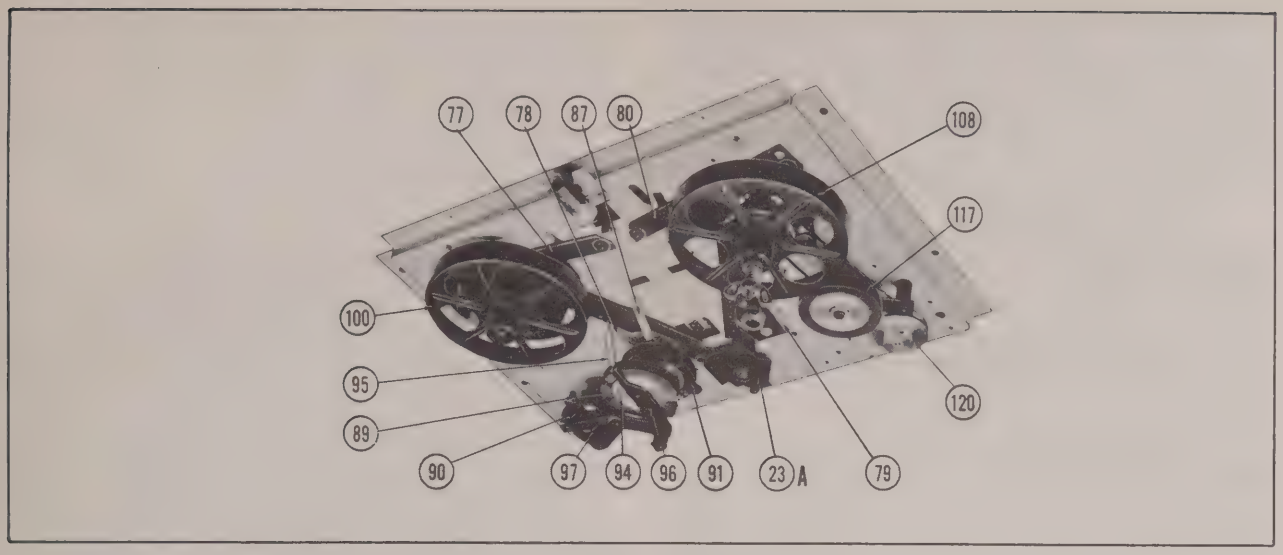


Fig. 6. Bottom View of Tape Transport Mechanism With Support Plate Assembly (132) and Flywheel (129) Removed

9. HEAD ADJUSTMENT AND REPLACEMENT

Continuity Record-Playback Head Assembly — When troubleshooting reveals a defective erase or play-record coil, replace head (44) in the following manner:

a. Disconnect leads from continuity head (44); see Fig. 5. Remove three Phillips head screws (43) holding head assembly to the mechanism plate, and lift head.

b. When installing a new continuity head (44), connect leads as indicated in Fig. 5. Snugly tighten the three mounting screws (43) over their respective head mounting springs (45). The ground lead terminal lug (see Fig. 5) should be attached to the mechanism plate with one of the Phillips head mounting screws in order to insure contact with ground. Mount the lug between head spring (45) and the bottom of the head mounting plate. Thread the unit with tape and adjust the back screw on the head until both the tape and pressure pad assembly (38) properly engage the head groove. Adjust the two screws on the front of the head for maximum output, using a constant-frequency tape of 7,500 cycles at 7 1/2 ips, if available. This same tape may be used at 3 3/4 ips to provide a 3,750-cycle alignment signal. If not available, use a previously recorded tape and align the head for maximum output of the high frequency response with the tone control turned fully clockwise (treble).

"Beep" Signal Head Assembly — When troubleshooting reveals a defective erase or play-record coil, replace head (44A) in the following manner;

a. Disconnect leads from signal head (44A); see Fig. 5. Remove three Phillips head screws (43) holding head assembly to mechanism plate, and lift head.

b. When installing a new signal head (44A), connect leads as indicated in Fig. 5. Snugly tighten the three mounting screws (43) over their respective head mounting springs (45). Thread the unit with tape and adjust the front screw on the head until both the tape and pressure pad assembly (38) properly engage the head groove.

c. To align "Beep" signal head:

1. Connect an AC vacuum-tube voltmeter between pin 1 and ground of tube 6AU6 (V9).

2. Thread the unit with a 1-mil, 1,000-cycle prerecorded tape and play the tape across the head.

3. Adjust the two screws on the back of the head for maximum output as read on pin 1 of 6AU6 (V9). Playback of recorded signal must read a minimum of 8 VAC for proper conduction of tube 6AU6 (V9) through relay (M16).

4. With a DC milliammeter connected at point "X" as shown on schematic (Page 21), adjust control (R37) to read .5 ma standby current through relay (M16) with mechanism in "Stop" position.

5. The recording of a control signal on tape is automatically erased when the signal Record-Listen knob (3A) is in the record position. If a slide projector is not available, tape erase may be quickly checked with an ohmmeter.

Record a "Beep" signal on tape. Then erase this same signal. Connect an ohmmeter across receptacle (to projector). Play back the recorded signal and observe the ohmmeter for a continuity reading. If a reading is observed, the signal is not erased from tape, or relay (M16) contacts are stuck. If relay contacts are stuck, adjust control (R37) for proper standby current through relay (M16). With proper standby current, the DC erase current through the erase coil of head (44A) should be sufficient to erase the tape.

Conversely, the ohmmeter may be used to see if a recorded control signal is operating the relay amp-

lifier tube (V9) into conduction for the triggering of a slide projector. Connect the ohmmeter as before and play back a recorded 1,000-cycle signal. Observe the ohmmeter for a continuity reading at the intervals at which the 1,000-cycle signals were recorded.

10. PRESSURE PAD AND LEVER ADJUSTMENTS

Pressure pad and lever assembly (38) should be cleaned (paragraph 6c), adjusted or replaced in the following manner:

a. To adjust pressure pad assembly (38), remove plastic cover and top panel as covered in paragraph 5b.

b. To remove assembly for cleaning, repair, or adjustment, remove three screws (18), bracket assembly (17), spring (39), and retaining ring (36). Rotate the pressure pad assembly slightly counterclockwise and lift off.

c. Reassemble in reverse order and re-lubricate per paragraph 7.

d. Adjust by turning knob (2) to "Forward" position and check to be sure pads engage grooves of heads properly. If not, bend levers as required.

NOTE: Be sure the face of the felt pads press against the erase and record pole pieces.

11. PINCH ROLLER ADJUSTMENT

If pinch roller (28) is damaged or out of adjustment, replace, clean, and adjust in the following manner:

a. Remove top panel (6) as covered in paragraph 5b, bracket and bushing assembly (17) as covered in paragraph 10b, and cam and plate assembly (23) by loosening two setscrews (24).

b. Remove springs (33) and (35), and retaining ring (30).

c. Remove both assemblies (32) and (34) from shaft attached to mechanism plate.

d. Clean thoroughly, removing old grease and dirt, and re-lubricate (see paragraph 7). Reassemble in reverse order.

e. Adjust tab on follower lever assembly (34) so pinch roller assembly (28) engages the flywheel shaft just before brake lever assembly (73) releases supply reel pulley (11) from "Stop" position to "Forward", thereby preventing flare out of the tape on the supply reel.

12. IMPROPER "REWIND" OPERATION

If the equipment does not perform properly in "Rewind" position, check as follows:

a. A damaged or worn clutch disc assembly (125) may be the cause of improper "Rewind". To replace a damaged motor pulley (127) and clutch disc assembly (125) remove unit from case as described in paragraph 5c. Unhook springs (87) and (95), unsolder the two motor leads and remove the three mounting screws (135) and washers (134) from the support plate assembly (132). Carefully remove the assembly so as not to damage the drive idler addemblies (91) and (94). Loosen the two Allen head set screws (128) and remove assembly. Reassemble with a new pulley in reverse order.

b. A worn, damaged, or dirty supply reel shaft support assembly (77) may be responsible for improper "Rewind". To correct faulty operation, remove unit from the case as described in paragraph 5c. Unsolder the motor leads. Unhook the two drive idler springs (87) and (95) from the support plate assembly (132). Remove the motor and plate assembly as described in paragraph 12a above. Remove six mounting screws (131) and remove support plate assembly (132). Remove flywheel (129), steel ball (130), cam and plate assembly (23), and cam and shaft assembly (23A). Loosen the two Allen head set screws (101) on the reel pulley assembly (100) to permit removal of the pulley. Pull out the reel shaft assembly (11). Unhook the spring (78) on the reel shaft support assembly (77), and remove the retaining rings (85), spring tension washers (84), and flat washers (83). This will free the reel shaft support assembly. Clean, repair, or replace any damaged or worn parts before reassembly. See paragraph 7 for lubrication.

13. ADJUSTING BRAKE LEVER ASSEMBLIES

a. If tape overruns from "Rewind" to "Stop" position, remove top panel (6) and screen panel (14) as described in paragraphs 5b and 5c. Turn gear and shaft assembly (19) to "Rewind" position (counterclockwise as far as possible). Adjust the right brake lever assembly (71) so that the brake cup on reel shaft assembly (12) clears the brake lever pad by 1/64 inch maximum. Adjustment is made by bending the brake lever assembly (71) near the bent portion. Refer to Figure 1. Next, turn the gear and shaft assembly (19) from "Rewind" to "Stop" position, observing that the reel brake cup compresses the brake lever pad about 1/64 inch while midway between the two positions. Compression adjustment may be made by bending the brake lever stop on the mechanism panel. When the unit is in the "Stop" position, clearance must exist between brake lever assembly (71), the brake rests located on the remote lever assembly (69), and the brake lever stops located on the mechanism panel.

b. If tape overruns from "Fast Forward" to "Forward", check operation of left brake lever assembly (73) as explained in paragraph 13a, except with the gear and shaft assembly (19) turned to the "Fast Forward" position (clockwise as far as possible).

14. CORRECTING "TAKE-UP" AND "FAST FORWARD" TROUBLES

If the "Take-Up" or "Fast Forward" drive does not function properly, remove unit from case (paragraph 5c). Check as follows:

a. If "Take-Up" or "Fast Forward" drive is weak, screw the self-locking wing nut (112) so the reel shaft will not slip relative to the reel pulley assembly (108) with less than 4 inch-ounces torque.

b. If weak drive persists after the above adjustments, remove the self-locking wing nut (112), spring (111), washer (110), fibre washer (109), and reel pulley assembly (108). Check the felt pad on pulley assembly (108). If the pad is badly worn, replace the reel pulley assembly. (108), but if pad shows no excessive wear, remove retaining ring (107), and clutch disk (106). Check to see if drive pin (105) is properly seated. Now, check "U" shaped washer (104) to see that it is not damaged. The washer should have an overall height of 3/32 inch. If at fault repair or replace washer. If pin (105) is worn or damaged, replace. Oil reel pulley assembly (108) slightly (see paragraph 7a) and reassemble. Adjust wing nut (112) to give a torque load on the reel shaft (12) of 4-5 inch-ounces.

c. Excessive noise in "Forward" or "Fast Forward" position indicates a dirty or damaged idler assembly (117), or dirty bearings on the take-up shaft or pulley assembly. To check, remove unit from case (paragraph 5c), and inspect idler assembly and determine if dirty or damaged. Clean any dirt from idler tire and bearing. Clean flywheel and shaft assembly (129), reel pulley assembly (108), (drive area only), with a suitable solvent (see paragraph 6). Relubricate as necessary (see paragraph 7).

d. If noise still exists and corrective measure 14c has been exercised, check reel shaft assembly (12). To disassemble follow procedure outlined in paragraph 14b and in addition remove two set screws from pulley (103), retaining ring (82), fibre washer (81), reel shaft assembly (12), and fibre washer (13). Clean and inspect all parts for wear or damage. Clean the bearing in reel shaft support assembly (80) and inspect bearing. Relubricate (paragraph 7), replace any damaged parts, and reassemble in order shown in Figure 3.

15. REMOTE CONTROL INOPERATIVE

To correct an improperly functioning remote lever assembly (69), disassemble the unit as covered in paragraphs 5b and 5c. Clean, repair and adjust as follows:

a. Remove the retaining rings and washers that are used to mount the lever assembly. Detach springs (70) and (72) and remove lever assembly. Clean and lubricate (see paragraph 7) and reassemble.

b. If pinch roller assembly (28) does not engage the flywheel and shaft assembly (129) with remote lever assembly (69) in running position, or does not disengage flywheel and shaft assembly when remote lever is in "Stop" position, adjust tab in which spring (70) is hooked so that the remote lever, when actuated to the "Stop" position causes the pinch roller to disengage the flywheel and shaft assembly with a clearange of 1/64 to 1/32 inch. Release remote lever assembly and make sure that the tab on the remote lever clears the pinch roller lever assembly (32).

16. SPEED SELECTOR OR EQUALIZER SWITCH INOPERATIVE

a. If the "Speed Selector" is out of adjustment, disassemble equipment as covered in paragraphs 5b and 5c, and clean, repair or replace as necessary. Broken or unhooked springs (87 or 95) on drive idler assemblies or cam shaft assembly (90) being out of adjustment would be the chief causes of faulty operation. Check to see that the follower pins on the ends of the lever and idler assemblies (89) and (96) drop into the recesses on the cam shaft assembly (90) when the shaft is turned to its two different positions. Adjustment is made by loosening the set screws (57 & 58) in switch cam (53) and turning cam shaft assembly (90) as required.

b. Failure of the "Equalizer Switches" (M6 & M7) may be due to the switch cam assembly (53) being loose on the cam shaft assembly (90). To adjust, turn cam shaft assembly to "off" position and set arms of switch cam assembly the same distance from equalization switch (M6). Tighten set screws (57 & 58) in this position. Check to see that mechanical linkage from (M6) to (M7) is intact.

17. PROPER ACTION OF THE AUTOMATIC "TAPE-OFF" SWITCH

The Ekotape Model 310 employs an automatic switch (M10, "Tape-off" switch) which stops the motor (137) when tape runs out in either "Rewind" or "Forward" positions. This action is accomplished by use of switch (M10) being held in the closed position by the tape (motor running). When tape runs "out", the switch drops into "open" position, stopping the motor. This is a precision switch, and proper adjustment is important whenever the switch is replaced or the switch does not function properly.

If replacement is necessary, order the complete switch and bracket assembly (Item 46 on Exploded View) Part No. 242-24018. This assembly is preadjusted before shipment; however, it is still advisable to check proper action before installation. Correct action is such that as the plastic arm is moved to the "closed" position, and just as the switch snaps, the arm should be vertical to the bracket. If this is not the case the arm should be bent so proper action is developed. Use a long nose pliers, bending at the metal section of the arm as shown in illustration (A).

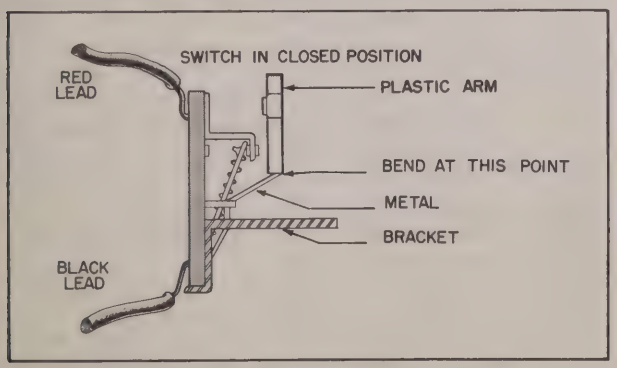


Illustration (A). "Tape-Off" Switch Adjustment

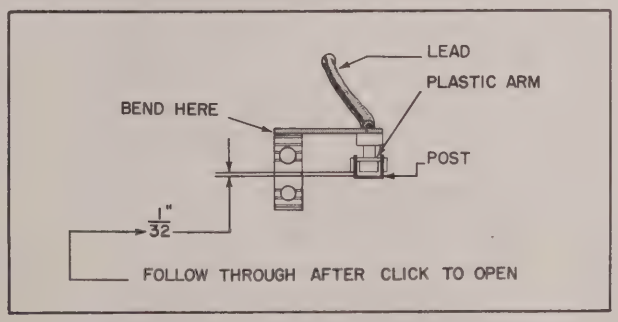


Illustration (B). "Tape-Off" Switch Adjustment

To check the preadjustment, fasten switch to mechanism plate by means of two screws (47), threading leads per original. Be sure to solder black lead to terminal strip directly under 5Y3 tube (V7) socket and red lead to bottom pin on AC receptacle Then hold bracket and switch in the extreme position away from guide post, and turn screws (47) "in" just enough to hold bracket in place; note position of switch arm as unit is indexed to "Play" position. If arm "hangs up", move the bracket so that plastic arm falls into the guide post. Then note action of arm when tape runs "out" in both "Forward" and "Rewind" positions. The arm should now be centered so that the arm will fall into the post in either "Rewind" or "Forward" position when tape runs "out". Proper setting of arm to post is made by moving switch and bracket slightly as needed. After adjustment, tighten the two screws.

After the above adjustment is made, place the recorder in "Forward" position without tape, and the motor should remain "off". If the motor still runs, the switch is not in the "open" position and the metal bracket should be bent downwards until the switch moves to "open" and motor remains "off". Bracket can be bent by use of a screw driver set on top of it, slightly tapping the screw driver handle with the hand. The switch action is correct when the arm moves into post and snaps into "open" about 1/32 of an inch before coming to rest on the post. If this position is set too far away, the switch will open in the "Rewind" position and at times even in the "Forward" position.

After above settings have been made, a final operating check should be made to be sure that pressure on the switch leads in assembly has not disrupted the settings.

PARTS LIST

Many of the parts of the recorder are indicated on the illustrations with their reference numbers in the parts list. It is preferable to replace complete subassemblies from the standpoint of saving time on repairs and for better performance after repair. When ordering parts always refer to the model and serial number on nameplate which is located on storage compartment hinged door.

a. The list is separated into three columns: Ref. No., Part No., and Description. The Ref. No. column has a number which is assigned in numerical order of appearance of the part. The Description column gives the part name.

b. When ordering a part, include the Ref. No., from the first column, the Part No., and the Description.

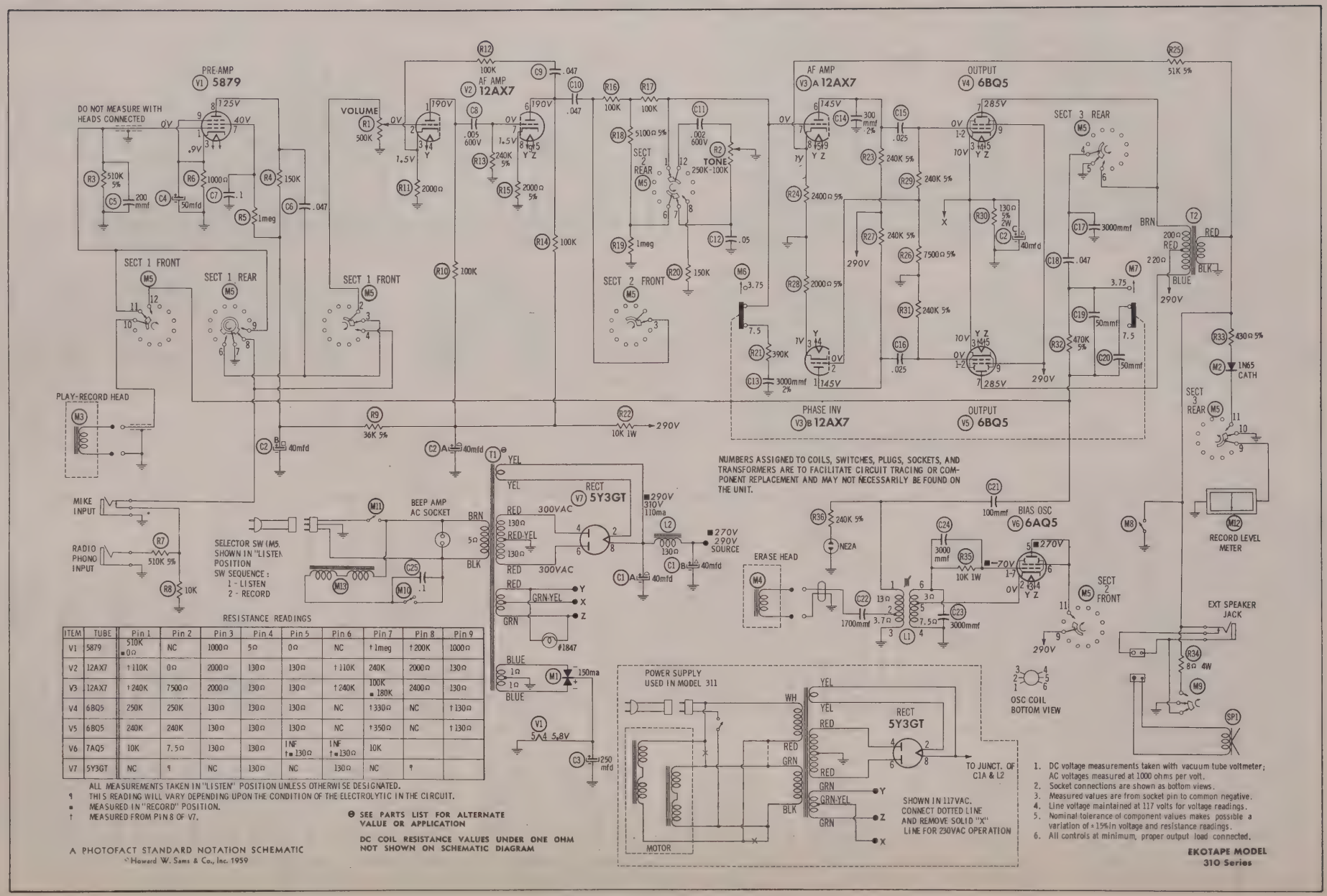
MECHANICAL PARTS LIST

Ref. No.	Part No.	Description
1	241-24064	Knob
2	242-24068	Knob Assembly
3	242-24066	Knob Assembly
3A	212-24590	Knob Assembly, "Beep" Signal Amplifier
3B	241-25260	Screw, Knob Assembly
3C	242-25257	Knob Assembly
3D	241-25259	Spring, Knob Assembly
3E	241-25454	Button, "Beep" Signal Amplifier
3F	29602-134	Washer
3G	241-25455	Shaft
4	241-15116	Set Screw, Knob
4A	29540-9	Set Screw, Knob; Cup Pt. #8 - 32 x 3/16"
5	241-20433-4	Cover, Plastic
6	242-24061-3	Top Panel
7	29529-69	Phillips Pan Hd. Mach. Screw
7A	29529-70	Phillips Pan Hd. Mach. Screw
8	29602-111	Washer
9	29529-34	Phillips Pan Hd. Mach. Screw, #4-40 x 1"
10	241-18814-2	Head Cover, Plastic
11	242-17761	Reel Shaft Assembly
12	252-17771-5	Reel Shaft Assembly
13	241-17770	Washer
14	242-24059-1	Screen Panel Assembly
15	29529-68	Phillips Pan Hd. Mach. Screw
16	29602-103	Washer
17	242-24041	Bracket & Bushing Assembly
18	241-16306	Sems Fastener
19	242-24038	Gear & Shaft Assembly
20	29656-2	Retaining Ring
21	241-17723	Washer, Spring Tension
22	241-17722	Washer
23	242-24030	Cam & Plate Assembly
23A	242-24028	Cam & Shaft Assembly
24	29640-9	Set Screw, Cup Pt.
25	29527-4	Screw
26	29602-103	Washer
27	241-17747	Washer
28	242-17744-1	Pinch Roller Assembly
29	241-17722	Washer
30	29650-1	Retaining Ring
31	241-17722	Washer
32	242-17741-1	Pinch Roller Lever Assembly
33	241-12138	Spring
34	242-17739-1	Follower Lever Assembly
34A	241-17897-2	Roller
34B	29650-7	Retaining Ring
35	241-14252	Spring
36	29650-1	Retaining Ring
37	241-17723	Washer, Spring Tension
38	242-25765	Pressure Pad Assembly
39	241-24556	Spring
40	29651-1	Retaining Ring
41	242-24024	Kickout Lever Assembly
42	241-24027	Spring
43	29525-6	Phillips Flat Hd. Mach. Screw, #4-40 x 3/8"
44	242-25447	Record Head Assembly
44A	242-25446	Signal Head Assembly
45	241-24075	Head Mtg. Spring

MECHANICAL PARTS LIST (CONT.)

Ref. No.	Part No.	Description
46	242-24018	Switch & Bracket Assembly
47	241-18841	Pan Hd. Sems Fastener, #4-40 x 3/16"
48	29651-1	Retaining Ring
49	241-12059	Washer, Spring Tension
50	29602-154	Washer
51	241-24023	Slide Lever
51A	241-25317	Tape Guide Post & Switch Retainer
51B	241-18841	Pan Hd. Sems Fastener, #4-40 x 3/16"
52	241-17734	Spring
53	242-25262	Switch Cam Assembly
54	241-25269	Switch, Power On-Off
55	241-18841	Pan Hd. Sems Fastener, #4-40 x 3/16"
56	241-13288-7	Insulating Strip
57	29540-9	Set Screw, Cup Pt.
58	29542-5	Set Screw, Cone Pt.
59	29651-4	Retaining Ring
60	241-12059	Washer, Spring Tension
61	242-17713-7	Index & Interlock Lever Assembly
61A	29651-1	Retaining Ring
61B	29650-7	Retaining Ring
61C	241-17897-2	Roller
61D	241-25428	Interlock Lever
61E	242-25441	Switch Cam Assembly
61F	29542-5	Set Screw, Cone Pt.
61G	29569-12	Phillips Bnd. Hd. Screw, #6 x 1/4"
61H	241-25440	Bracket
61J	29630-4	Hex Nut
61K	29601-1	Lockwasher
61L	241-25435	Switch
61M	242-18837	Can Assembly
62	241-17802	Spring
62A	241-17734	Spring
63	241-20477-1	Counter
64	241-17886	Sems Fastener, #6-32 x 3/16"
65	241-20478	Bracket
65A	29602-4	Washer
66	29651-1	Retaining Ring
67	241-12059	Washer, Spring Tension
68	29602-124	Washer
69	242-17755	Remote Lever Assembly
70	241-17734	Spring
71	241-17758-3	Brake Lever Assembly
72	241-17734	Spring
73	242-17758-3	Brake Lever Assembly
74	29651-4	Retaining Ring
75	241-12059	Washer, Spring Tension
76	242-17683-9	Mechanism Plate Assembly
77	242-17695-3	Reel Shaft Support Assembly (Left)
78	241-17802-1	Spring
79	241-17801	Spring
80	242-17703-4	Reel Shaft Support Assembly
81	241-17770	Washer
82	29650-2	Retaining Ring
83	29602-124	Washer
84	241-12059	Washer, Spring Tension

Ref. No.	Part No.	Description
85	29651-4	Retaining Ring
86	241-17770	Washer
87	241-17802	Spring
88	241-17735	Idler Link
88A	241-17722-1	Washer
89	241-17733	Follower Lever
89A	241-17723	Washer, Spring Tension
89B	29650-1	Retaining Ring
90	242-17724-2	Cam Shaft Assembly
91	242-17719-3	Idler Assembly
92	29650-1	Retaining Ring
93	241-17722-1	Washer
94	242-17719-3	Idler Assembly
95	241-17802	Spring
96	241-17735	Idler Link
97	241-17733	Follower Lever
97A	241-17723	Washer, Spring Tension
97B	29650-1	Retaining Ring
98	241-17723	Washer, Spring Tension
99	29650-1	Retaining Ring
100	242-17766	Reel Pulley Assembly
101	29540-9	Set Screw, Cup Pt.
102	241-20481	Belt
103	241-20479	Pulley
103A	29540-9	Set Screw, Cup Pt.
104	241-17775	Washer
105	241-17086-4	Pin
106	241-17777	Clutch Disc
107	29650-2	Retaining Ring
108	242-17773	Reel Pulley Assembly
109	241-20551	Fibre Washer
110	29602-102	Washer
111	241-17644	Spring
112	241-17799-1	Self-Locking Wing Nut
113	241-17717	Idler Link
114	241-17723	Washer, Spring Tension
115	29650-1	Retaining Ring
116	241-17722-1	Washer
117	242-17719-3	Idler Assembly
118	241-17722-1	Washer
119	29650-1	Retaining Ring
120	241-20480	Pulley
121	29540-1	Set Screw, Cup Pt., #6-32 x 3/16"
122	29650-6	Retaining Ring
123	241-17795	Washer, Spring Tension
124	241-17794	Washer
125	242-17791	Clutch Disc Assembly
126	241-17793	Motor Pulley Clutch Disc
127	241-17789-2	Motor Pulley
128	29540-9	Set Screw, Cup Pt., #8-32 x 3/16"
129	242-17778-1	Flywheel & Shaft Assembly
130	241-13609	Ball
131	241-16306	Sems Fastener, #8-32 x 1/4"
132	242-17765-3	Support Plate Assembly
133	241-17787	Shock Mount
134	241-17763	Washer
135	241-17827	Sems Fastener, #10-32 x 11/16"
136	241-17786-3	Motor Mounting Plate
137	241-25264	Motor
138	241-14134	Fan
139	29540-9	Set Screw, Cup Pt.



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	5879	510K ▪0Ω	NC	1000Ω	5Ω	0Ω	NC	†1meg	†200K	1000Ω
V2	12AX7	†110K	0Ω	2000Ω	130Ω	130Ω	†110K	240K	2000Ω	130Ω
V3	12AX7	†240K	7500Ω	2000Ω	130Ω	130Ω	†240K	100K ▪180K	2400Ω	130Ω
V4	6BQ5	250K	250K	130Ω	130Ω	130Ω	NC	†330Ω	NC	†130Ω
V5	6BQ5	240K	240K	130Ω	130Ω	130Ω	NC	†350Ω	NC	†130Ω
V6	7AQ5	10K	7.5Ω	130Ω	130Ω	INF †▪130Ω	INF †▪130Ω	10K		
V7	5Y3GT	NC	¶	NC	130Ω	NC	130Ω	NC	¶	

ALL MEASUREMENTS TAKEN IN "LISTEN" POSITION UNLESS OTHERWISE DESIGNATED.
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
▪ MEASURED IN "RECORD" POSITION.
† MEASURED FROM PIN 8 OF V7.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

EKOTAPE MODEL 310 Series

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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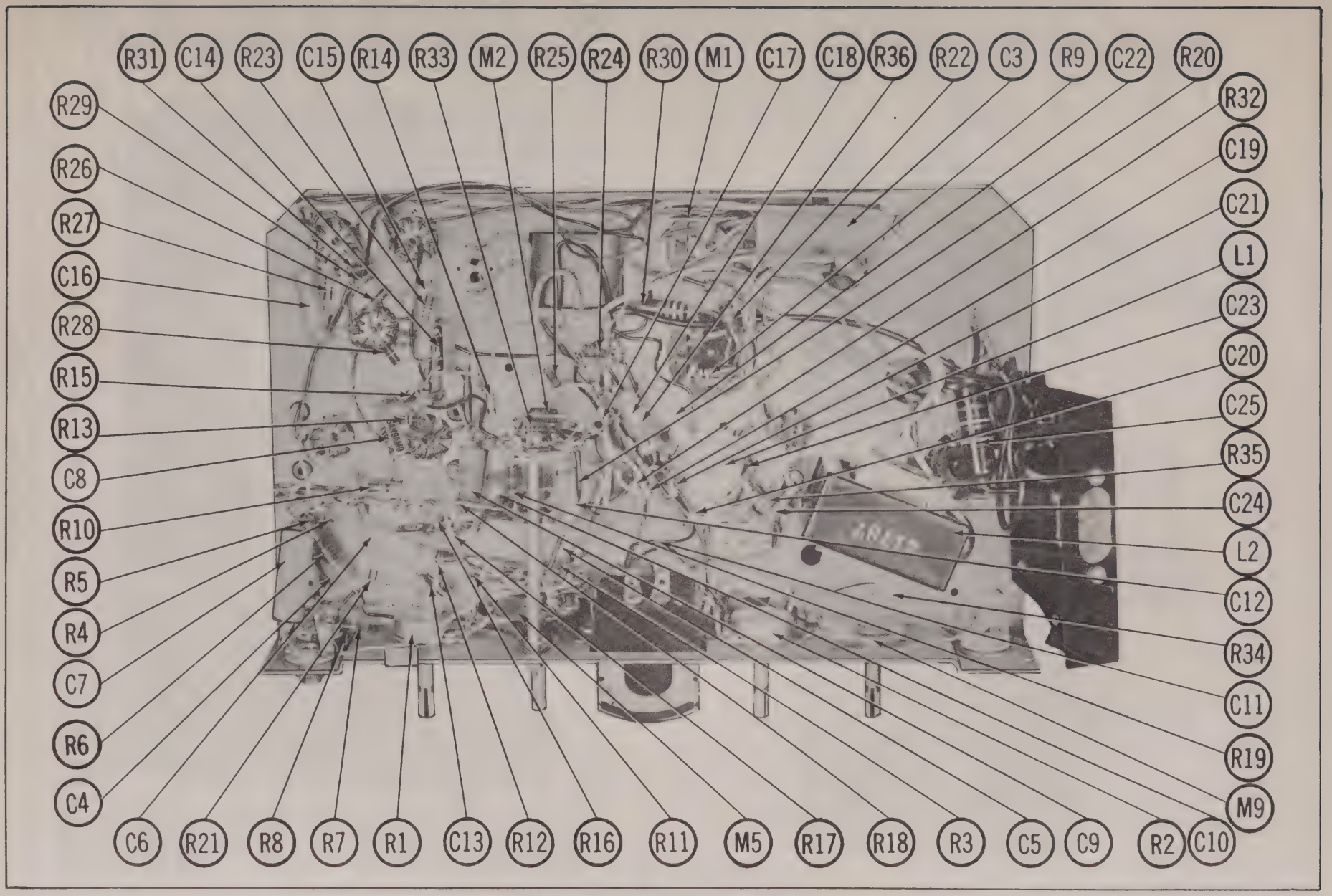
RECORDER AMP SCHEMATIC

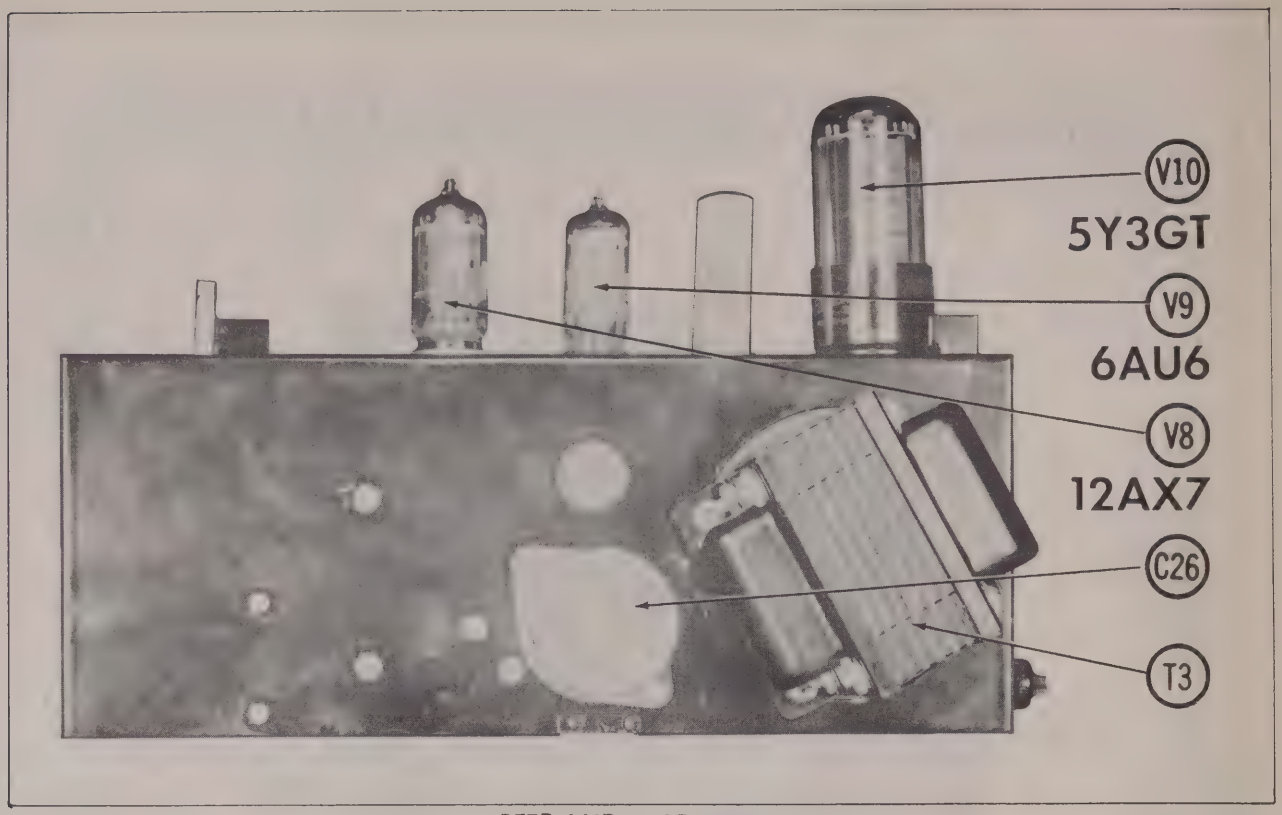


RECORDER AMP - BOTTOM VIEW

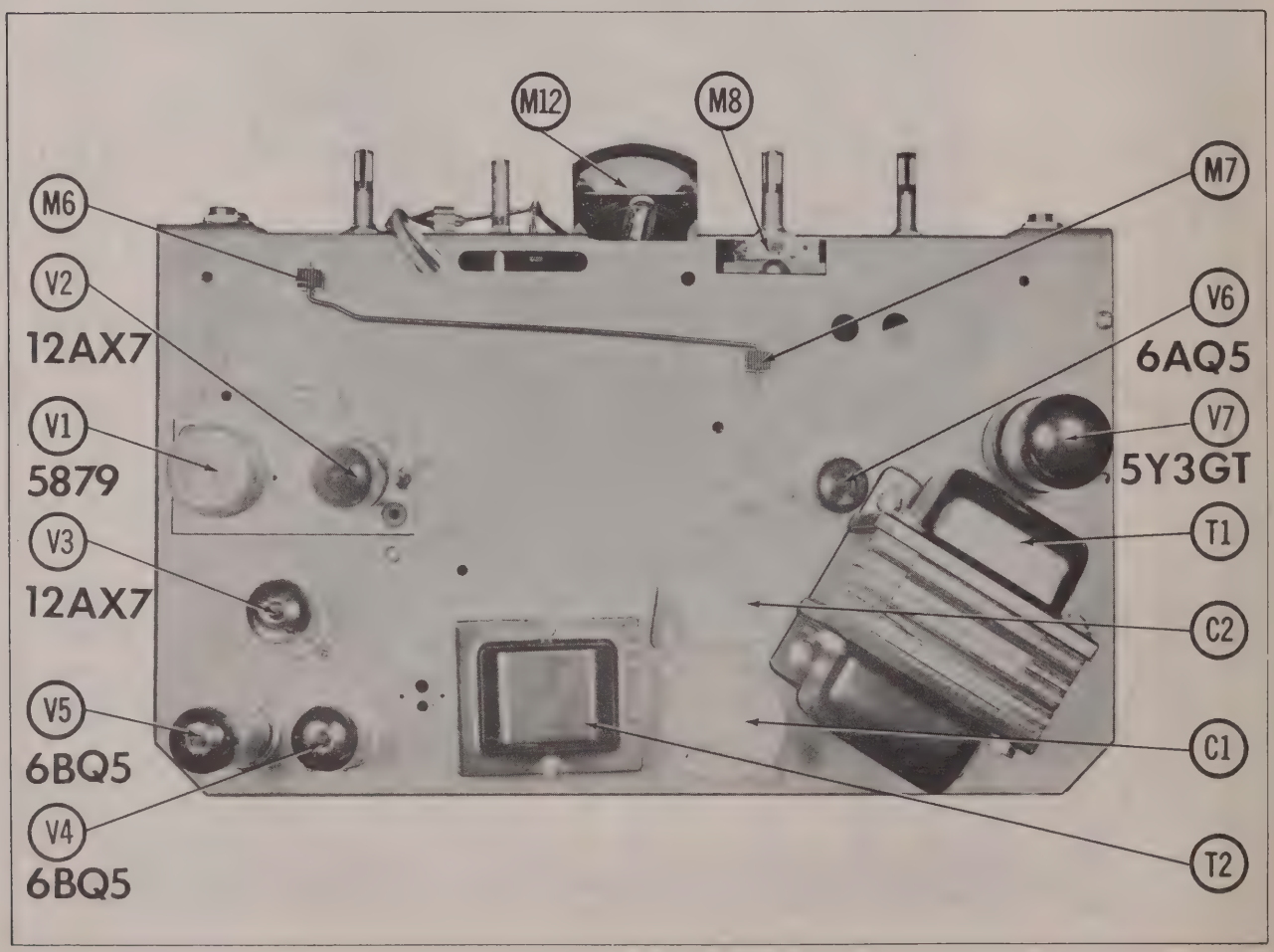
310 Series

EKOTAPE MODEL

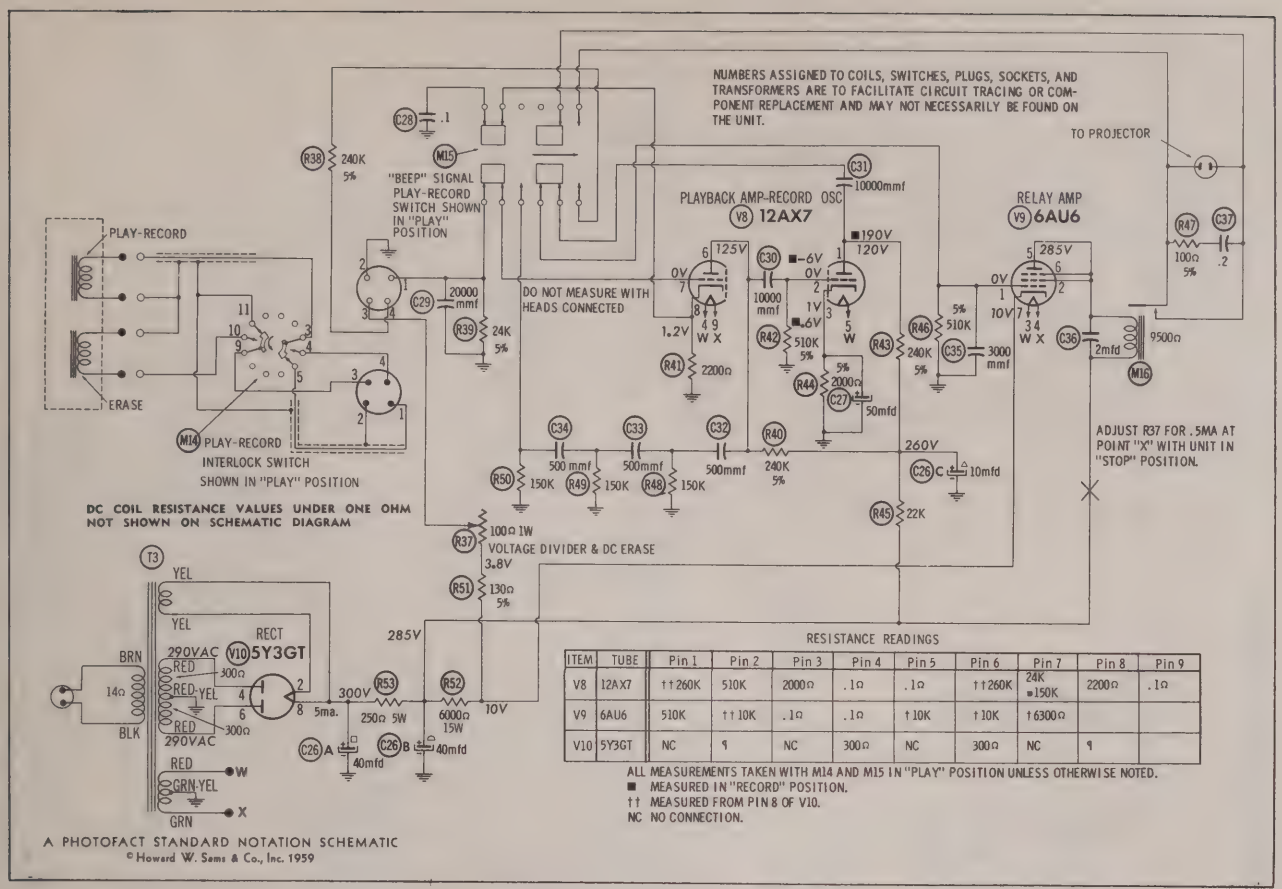
FOLDER 7



BEEP AMP - TOP VIEW



RECORDER AMP - TOP VIEW


NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
TO PROJECTOR
PLAY-RECORD
ERASE
"BEEP" SIGNAL PLAY-RECORD SWITCH SHOWN IN "PLAY" POSITION
PLAYBACK AMP-RECORD OSC V8 12AX7
RELAY AMP V9 6AU6
DO NOT MEASURE WITH HEADS CONNECTED
PLAY-RECORD INTERLOCK SWITCH SHOWN IN "PLAY" POSITION
ADJUST R37 FOR .5MA AT POINT "X" WITH UNIT IN "STOP" POSITION.
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
VOLTAGE DIVIDER & DC ERASE
RECT V10 5Y3GT
290VAC
285V
300V
260V
10V
3.8V
5ma.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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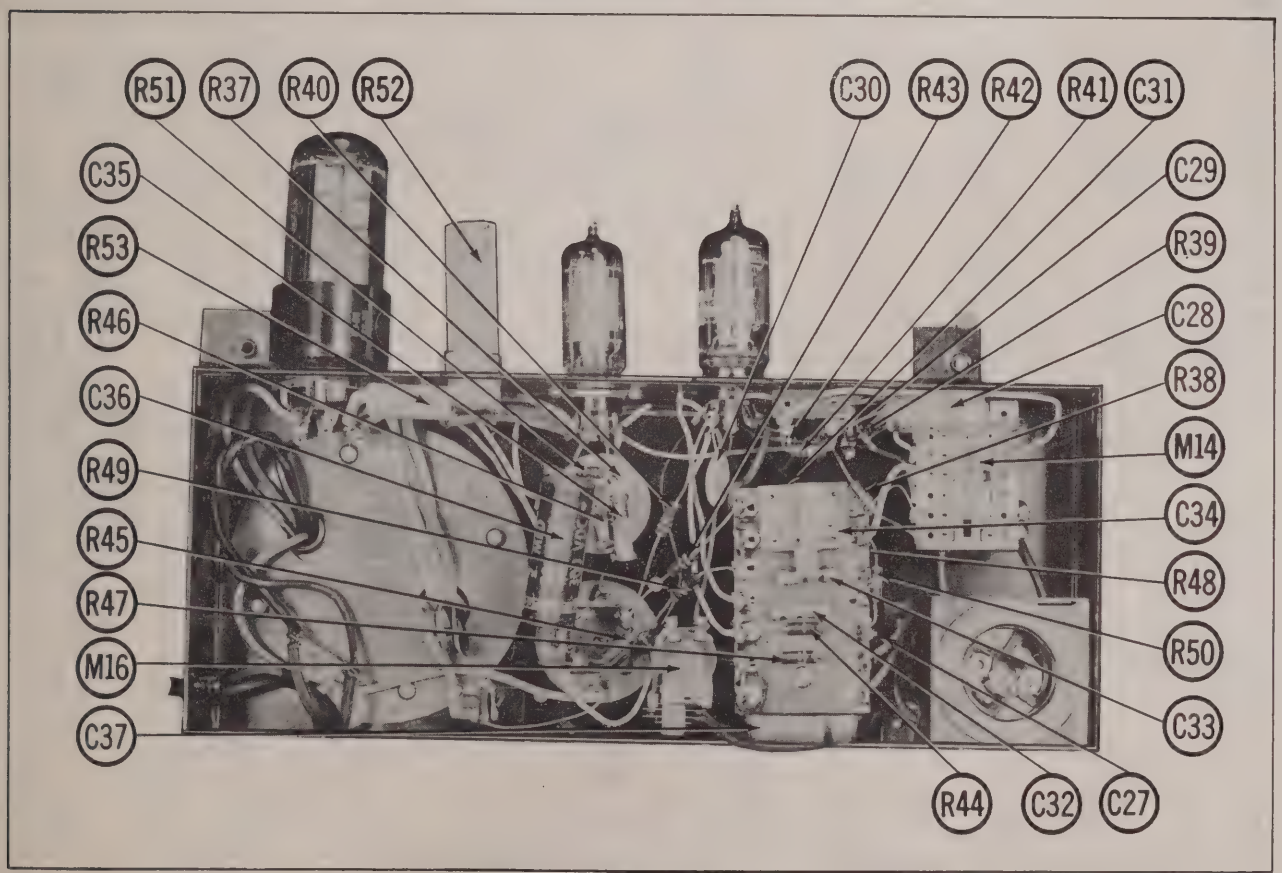
RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V8	12AX7	††260K	510K	2000Ω	.1Ω	.1Ω	††260K	24K =150K	2200Ω	.1Ω
V9	6AU6	510K	††10K	.1Ω	.1Ω	†10K	†10K	†6300Ω		
V10	5Y3GT	NC	¶	NC	300Ω	NC	300Ω	NC	¶	

ALL MEASUREMENTS TAKEN WITH M14 AND M15 IN "PLAY" POSITION UNLESS OTHERWISE NOTED.
■ MEASURED IN "RECORD" POSITION.
†† MEASURED FROM PIN 8 OF V10.
NC NO CONNECTION.

BEEP AMPLIFIER SCHEMATIC



BEEP AMP - BOTTOM VIEW

TAPE PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Preamplifier	5879	
V2	AF Amplifier	12AX7	
V3	AF Amp. -Phase Inv.	12AX7	
V4	Output	6BQ5	
V5	Output	6BQ5	
V6	Bias Oscillator	6AQ5	
V7	Rectifier	5Y3GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA EKOTAPE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▰40	450	241-14236	AFH2-57	B0450	FP238	TMD-54	TVL-2764	
B	▲40	450							
C2A	▰40	450	241-14238	AFH3-44	C0350	FP377	TMT-40	TVL-3787	
B	■40	450							
C	▲40	25							
C3	250	15	241-25845	PRS15V250	BR2501	TC50025	TD-250-15	TVA-1161	
C4	50	6	S6063	PRS25V50	BBR50-6	TT6X50	TD-50-6	TVA-1100	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA EKOTAPE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	200			S6065-3	SI 200	D6-201	L10T2	UC-532	5GA-T2	
C6	.047	400		211-15048	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C7	.1	400		S3595	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C8	.005	600		S4512	P688N-005	DD-502	CUB6D5	GEM-625	6TM-D5	
C9	.047	400		211-15048	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C10	.047	400		211-15048	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C11	.002	600		S4510	P688N-002	DD-203	CUB6D2	GEM-622	6TM-D2	
C12	.05	200		211-14912	P288N-05	DF-503	CUB2S5	GEM-215	2TM-S5	
C13	30000		2%	211-19827	1464-003 2%		1R5D3 2%	MCE461	MS-23	
C14	300		2%	211-19833	1469-0003 2%		5R5T3 2%	MCE241	MS-33	
C15	.025	400		S4282	P488N-025	DF-303	ST6S25	GEM-4125	4TM-S25	
C16	.025	400		S4282	P488N-025	DF-303	ST6S25	GEM-4125	4TM-S25	
C17	3000			241-14260-1	SI 3000	D6-302	L10D3	UC-523	5GA-D3	
C18	.047	400		211-15048	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C19	50			S6065-11	SI 50	D6-500	L10Q5	UC-545	5GA-Q50	
C20	50			S6065-11	SI 50	D6-500	L10Q5	UC-545	5GA-Q50	
C21	100			S6065-2	SI 100	D6-101	L10T1	UC-531	5GA-T1	
C22	1700			241-14260-2	SI 1800	D6-182	L10D18	UC-5218	5GA-D18	
C23	3000			241-14260-1	SI 3000	D6-302	L10D3	UC-523	5HK-D3	
C24	3000			241-14260-1	SI 3000	D6-302	L10D3	UC-523	5HK-D3	
C25	.1	400		211-13083	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA EKOTAPE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	241-17940-2	B-60	A47-500K-Z	Q13-133	U48	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R2	350K *	½	241-25267					Tone

* Open element ⓐ 250K

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	EKOTAPE PART No.	NOTES
R3	510K 5%		29501-53	
R4	150K		29501-44	
R5	1meg		29501-57	
R6	1000Ω		29501-11	
R7	510K 5%		29501-53	
R8	10K		29501-24	
R9	36K 5%		29501-33	
R10	100K		29501-41	
R11	2000Ω		29501-14	
R12	100K		29501-40	
R13	240K 5%		29501-48	
R14	100K		29501-41	
R15	2000Ω 5%		29501-14	
R16	100K		29501-41	
R17	100K		29501-41	
R18	5100Ω 5%		29501-21	
R19	1meg		29501-57	
R20	150K		29501-44	
R21	390K		29501-113	
R22	10K	1	29501-76	
R23	240K 5%		29501-48	
R24	2400Ω 5%		29501-15	
R25	51K 5%		29501-35	
R26	7500Ω 5%		29501-162	
R27	240K 5%		29501-48	
R28	2000Ω 5%		29501-14	
R29	240K 5%		29501-48	
R30	130Ω 5%	2	29501-161	
R31	240K 5%		29501-48	
R32	470K 5%		29501-52	
R33	430Ω 5%		29501-137	
R34	8Ω	4	241-21803	
R35	10K	1	29501-76	
R36	240K 5%		29501-48	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA EKOTAPE PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Bias Osc.	241-14246-1						

FILTER CHOKE

ITEM No.	RATINGS CURRENT (Measured)	RATINGS DC RES.	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA EKOTAPE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L2	.110A	130Ω	5.5 HY	242-21787	20C48			C-1709	20C48	C-9X

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA EKOTAPE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⓐ .8A	600 VCT ⓐ .110A	5V ⓐ 2A	242-25330①						
	SEC. 3	SEC. 4	SEC. 5							
	6.3 VCT ⓐ 2.1A	11 VCT ⓐ .3A								

① Used in Model 310.
Part #242-22170 used in Model 311. (115-230V, 50~)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA EKOTAPE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	5300Ω CT	6-8Ω	242-25333	24S60①	A-2900①	AU-600①	A-3856①	24S60①	S-51X①	① Drill new mounting holes.

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA EKOTAPE PART No.	QUAM PART No.	NOTES
SP1	6" x 9"	PM	8-9Ω	241-25254	69A3	

PARTS LIST AND DESCRIPTIONS (Cont)

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA EKOTAPE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.150A	241-25846①				① Dual Selenium

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA EKOTAPE PART No.	CBS PART No.	SYLVANIA PART No.	NOTES
M2	1N65	211-19988	1N65	1N65	Overload Limiter (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	EKOTAPE PART No.	NOTES
M3	Record Head Assy.	242-25447	
M4	Erase Head Ass'y.	242-25446	
M5	Switch	241-17945-9	Selector (Rotary Wafer Type)
M6	Switch	241-21802-1	Speed Equalization (SPDT, Slide Type)
M7	Switch	241-21802-1	Speed Equalization (SPDT, Slide Type)
M8	Switch	241-21804	Muting
M9	Switch	241-17942-2	Speaker Off-On (Rotary Wafer Type)
M10	Switch	241-24021	Tape Off-On
M11	Switch	241-25269	Power Off-On
M12	Meter	241-24210	Record Level
M13	Motor	241-25264	

BEEP PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V8	Playback Amp. - Record Osc.	12AX7	

ITEM No.	USE	TYPE	NOTES
V9	Relay Amplifier	6AU6	
V10	Rectifier	5Y3GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	VOLT.	REPLACEMENT DATA EKOTAPE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C26A	▲40	450	241-18800	AFH3-43	C0340	FP376.8	TMT-38	TVL-3785	
B	■40	450							
C	▲10	450							
C27	50	6`	S6063	PRS25V50	BBR50-6	TT6X50	TD-50-6	TVA-1100	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	VOLT	TOL	REPLACEMENT DATA EKOTAPE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C28	.1	200		241-25475	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C29	20000			241-25471	BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C30	10000			241-17191	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C31	10000			241-17191	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C32	500			S3750	SI 500	D6-501	L10T5	UC-535	5GA-T5	
C33	500			S3750	SI 500	D6-501	L10T5	UC-535	5GA-T5	
C34	500			S3750	SI 500	D6-501	L10T5	UC-535	5GA-T5	
C35	3000			241-14260-1	SI 3000	D6-302	L10D3	UC-523	5HK-D3	
C36	2.0	200		241-24519			WMF1W2E			
C37	.2	400		211-14492	P488N-2		CUB4P2	GEM-402	4TM-P2	

BEEP PARTS LIST AND DESCRIPTIONS (Cont)

CONTROLS

ITEM No.	RATING RESISTANCE	WATTS	REPLACEMENT DATA EKOTAPE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R37A B	100Ω Shaft	1 (ww)	241-18796	WN-101 Not Req.	A43-100 FKS-1/4	W11-084 SK5	R100L Not Req.	DC Erase

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	WATT	EKOTAPE PART No.	NOTES
R38	240K 5%		29501-48	
R39	24K 5%		29501-30	
R40	240K 5%		29501-48	
R41	2200Ω		29501-105	
R42	510K 5%		29501-53	
R43	240K 5%		29501-48	
R44	2000Ω 5%		29501-14	
R45	22K		29501-29	

ITEM No.	RATING OHMS	WATT	EKOTAPE PART No.	NOTES
R46	510K 5%		29501-53	
R47	100Ω 5%		29501-3	
R48	150K		29501-44	
R49	150K		29501-44	
R50	150K		29501-44	
R51	130Ω 5%		29501-103	
R52	6000Ω	15	241-25469	
R53	250Ω	5	211-22994	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	SEC. 1	SEC. 2	REPLACEMENT DATA EKOTAPE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T3	117V@ .22A	580 VCT @.005A	5V@ 2A	242-17934	22R02①			P-8175②	22R02 ①	R-7A
	SEC. 3	SEC. 4	SEC. 5							
	6.3 VCT @.6A									

① Use original shields. ② Drill new mounting holes.

MISCELLANEOUS

ITEM No.	PART NAME	EKOTAPE PART No.	NOTES
M14	Switch	241-25435	Play-Record
M15	Switch	241-25463	"Beep" Signal Play-Record(Slide Type, 4Pole-2 Position)
M16	Relay	241-18799	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	241-24064	Tone, Speaker, Volume
Knob Ass'y.	242-24068	Function
Knob Ass'y.	242-24066	Speed Selector
Knob Ass'y.	212-24590	"Beep" Signal Amplifier
Knob Ass'y.	242-25257	Record-Listen

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

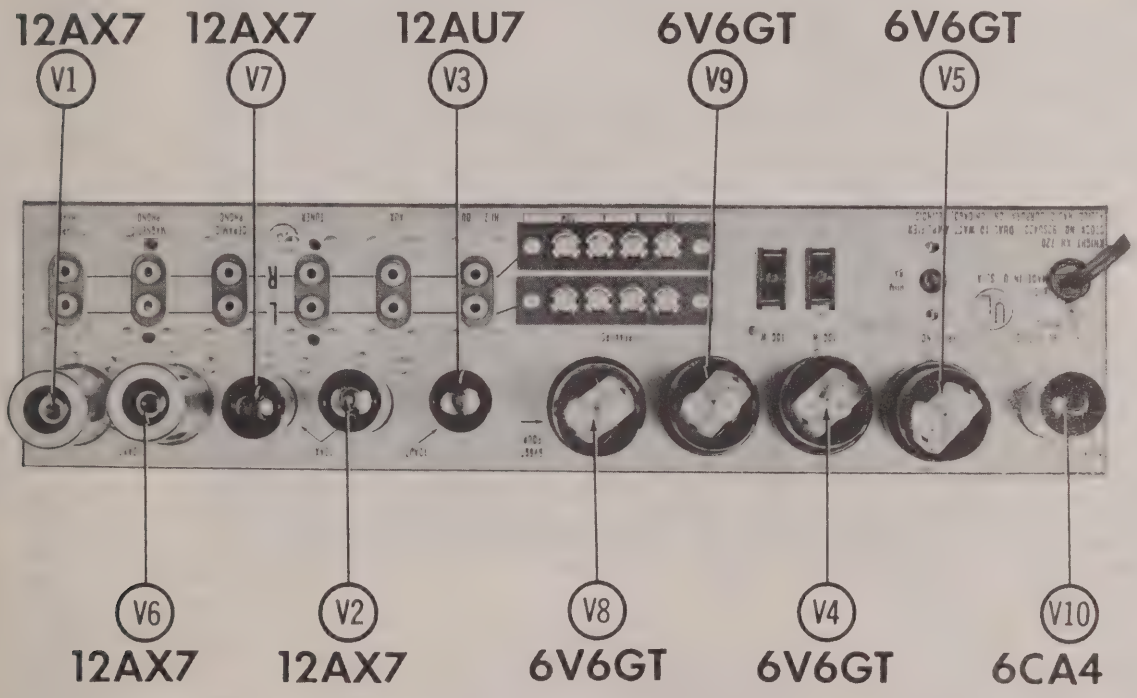
PHOTOFACT* Folder

EIA MEMBER

KNIGHT MODEL KN-720 (92SU420)

KNIGHT MODEL
KN-720 (92SU420)

TRADE NAME	Knight Model KN-720 (92SU420)
SUPPLIER	Allied Radio Corp., 100 N. Western Ave., Chicago 80, Illinois
TYPE SET	AC Operated 10 Tube Stereo Amplifier
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles RATING 100 Watts, 1 Amp. @117 Volts AC



KNIGHT MODEL
KN-720 (92SU420)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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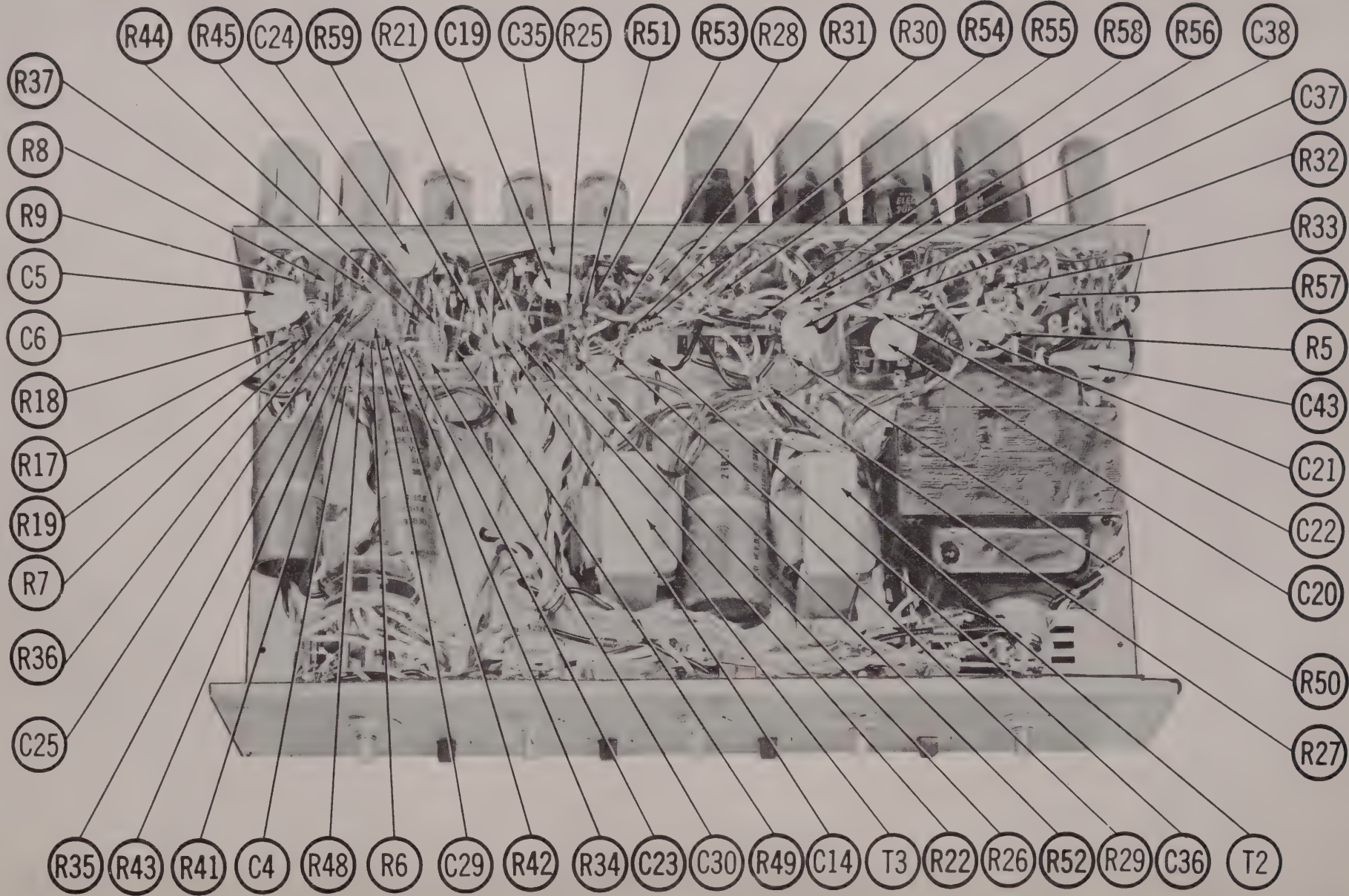


CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	Left Ch. Preamplifier	12AX7
V2	Left Ch. AF Amplifier	ECC83/12AX7
V3	Left Ch. Phase Inv. - Right Ch. Phase Inv.	ECC82/12AU7
V4	Left Ch. Output	6V6GT
V5	Left Ch. Output	6V6GT

ITEM No.	USE	TYPE
V6	Right Ch. Preamplifier	12AX7
V7	Right Ch. AF Amplifier	ECC83/12AX7
V8	Right Ch. Output	6V6GT
V9	Right Ch. Output	6V6GT
V10	Rectifier	EZ81/6CA4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT.	KNIGHT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.		
C1A	40	400		PRS450V4020	BBRQ222245	TCT3764	TDLD-30	TVA-2740		
B	20	400								
C2A	10	350		PRS450V1010	BBRD8D45	TCD62	TDLD-26	TVA-2722		
B	10	350								
C3	500	25		PRS25V500	BR5002	TC2505	TD-500-25	TVA-1209		

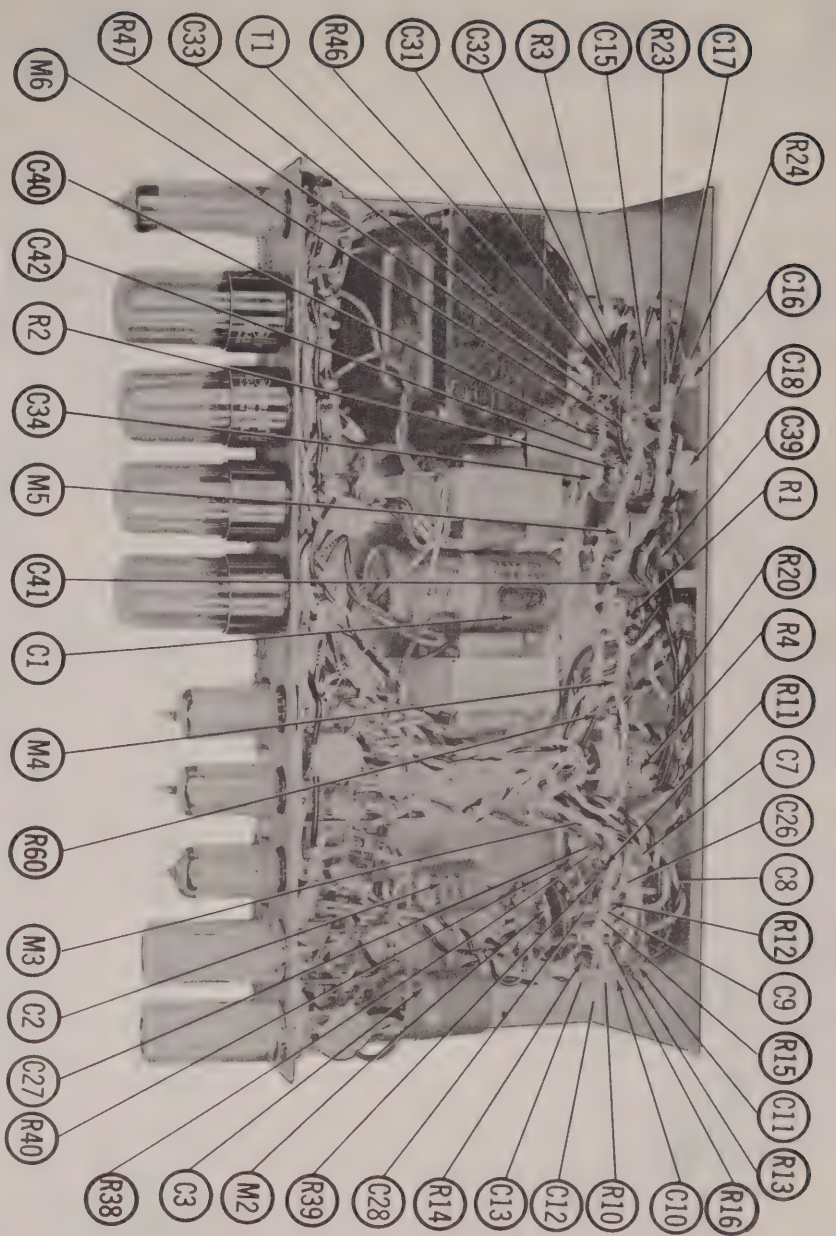
FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA							NOTES
	CAP.	VOLT	TOL	KNIGHT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.		
C4	47		N750		N750-DI 47	DTN-47	C10Q47U	CN7-447	5TCU-Q47		
C5	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1		
C6	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1		
C7	390		10%		DI 390	MD-391	L10T39	MCB243	5GA-T39S 10%*		
C8	1000		10%		DI 1000		1R5D1	JL-210	5GA-D1S 10%*		
C9	270		10%		DI 270	MD-271	L10T27	MCB241	5GA-T27S 10%*		
C10	1000		10%		DI 1000		1R5D1	JL-210	5GA-D1S 10%*		
C11	3300		10%		DI 3300		1R5D33	JL-233	5GA-D33S 10%*		
C12	330		10%		DI 330	MD-331	L10T33	JL-333	5GA-T33S 10%*		
C13	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1		
C14	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1		
C15	220		10%		DI 220	MD-221	L10T22	JL-322	5GA-T22S 10%*		
C16	2200		10%		DI 2200		1R5D22	JL-222	5GA-D22S 10%*		
C17	68		NPO 10%		NPO-DI 68	DTZ-68	C10Q68C	CNO-468	5TCC-Q68S 10%*		
C18	3300				BPD-00033	DD-332	BYA10D33	B-333	5GA-D33S 10%*		
C19	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1		
C20	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1		
C21	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1		
C22	220		10%		DI 220	MD-221	L10T22	JL-322	5GA-T22S 10%*		
C23	47		N750		N750-DI 47	DTN-47	C10Q47U	CN7-447	5TCU-Q47		
C24	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1		
C25	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1		
C26	330		10%		DI 330	MD-331	L10T33	JL-333	5GA-T33S 10%*		
C27	270		10%		DI 270	MD-271	L10T27	MCB-241	5GA-T27S 10%*		
C28	1000		10%		DI 1000	MD-102	1R5D1	JL-210	5GA-D1S 10%*		
C29	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1		
C30	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1		
C31	220		10%		DI 220	MD-220	L10T22	JL-322	5GA-T22S 10%*		
C32	2200		10%		DI 2200		1R5D22	JL-222	5GA-D22S 10%*		
C33	68		NPO 10%		NPO-DI 68	DTZ-68	C10Q68C	CNO-468	5TCC-Q68S 10%*		
C34	3300		10%		DI 3300		1R5D22	JL-333	5GA-D33S 10%*		
C35	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1		
C36	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1		
C37	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1		
C38	220		10%		DI 220	MD-221	L10T22	JL-322	5GA-T22S 10%*		
C39	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1		
C40	680		10%		DI 680	MD-681	1R5T68	JL-368	5GA-T68S 10%*		
C41	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1		
C42	680		10%		DI 680	MD-681	1R5T68	JL-368	5GA-T68S 10%*		
C43	.05	400			P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5		

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	KNIGHT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	15B8	B-60		Q13-133	† UE1398	Volume, Left Chan.
B	500K	½		SR-60		M13-133		Volume, Right Chan.
R2A	2meg	½	15B13	B-76		Q13-139	†	Bass, Left Chan.
B	2meg	½		SR-76		M13-139		Bass, Right Chan.
R3A	2meg	½	15B20A	B-76		Q13-139		Treble, Left Chan.
B	2meg	½		SR-76		M13-139	■	Treble, Right Chan.
C	Switch			KR-1		76-1		Power On-Off
R4A	500K	½	15B18A	B-60				Balance, Left Chan.
B	500K	½		SR-613				Balance, Right Chan.
C	Switch			KR-3				Stereo-Monaural
R5A	700Ω	½	15B35	B-2		B17-105		Hum Balance ①
B	Shaft			Not Req.		TM-1		

† "STA-LOC" equivalent: FA55A, RU55A, CS-3500
†† "STA-LOC" equivalent: FA26A, RU26A, CS-3500
■ "STA-LOC" equivalent: FA26A, RU26A, CS-3500, US-41
① Some versions may use 250Ω in this application.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		KNIGHT PART No.	NOTES
	OHMS	WATT		
R6	1.5meg			
R7	56K			
R8	10K			
R9	470K			
R10	1meg			
R11	270K			
R12	270K			
R13	3.3meg			
R14	1.2meg			
R15	270K			
R16	270K			
R17	680Ω			
R18	4.7meg			
R19	470K			
R20	56K			
R21	150K			
R22	2200Ω			
R23	330K			
R24	68K			
R25	100K			
R26	2200Ω			
R27	33K			
R28	1meg			

ITEM No.	RATING		KNIGHT PART No.	NOTES
	OHMS	WATT		
R29	47K			
R30	2200Ω			
R31	47K			
R32	470K			
R33	470K			
R34	1.5meg			
R35	56K			
R36	10K			
R37	470K			
R38	270K			
R39	270K			
R40	3.3meg			
R41	680Ω			
R42	4.7meg			
R43	470K			
R44	150K			
R45	2200Ω			
R46	68K			
R47	330K			
R48	100K			
R49	2200Ω			
R50	33K			
R51	1meg			

RESISTORS (cont)

ITEM No.	RATING		KNIGHT PART No.	NOTES
	OHMS	WATT		
R52	47K			
R53	2200Ω			
R54	47K			
R55	470K			
R56	470K			

ITEM No.	RATING		KNIGHT PART No.	NOTES
	OHMS	WATT		
R57	2200Ω	1		
R58	18K	1		
R59	100K			
R60	56K			

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	KNIGHT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⓐ 1A	620 VCT ⓐ .150A	6.3V ⓐ 4.5A	32B19 ①						

① Part #32B35 used for 50 - 60 cycles

TRANSFORMER (AUDIO OUTPUT)

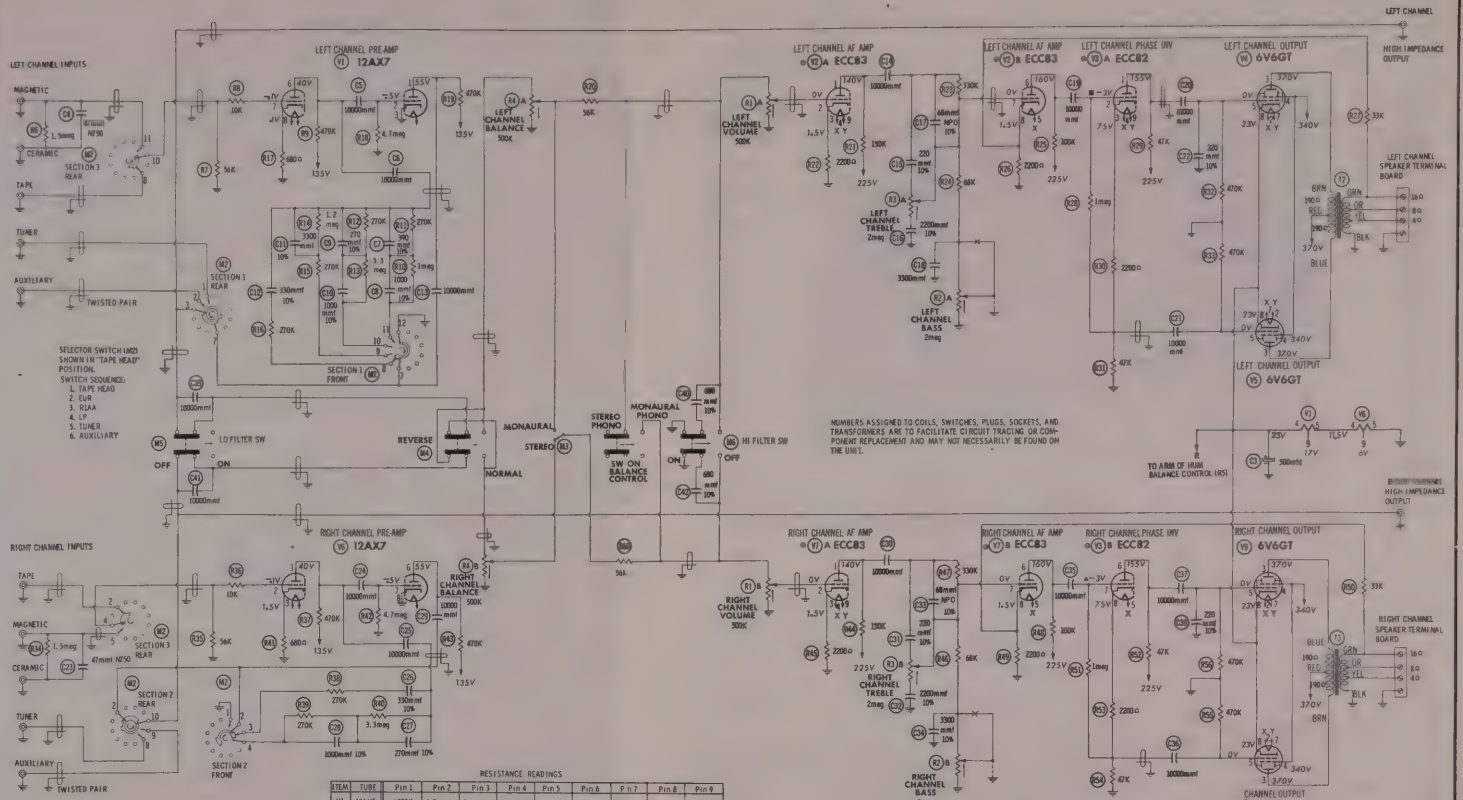
ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	KNIGHT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	8400Ω CT	16Ω Tap ⓐ 8Ω, 4Ω	B-20344	26S46	A-2904	AU-600	A-3852	26S46	S-55Z	
T3	8400Ω CT	16Ω Tap ⓐ 8Ω, 4Ω	B-20344	26S46	A-2904	AU-600	A-3852	26S46	S-55Z	

MISCELLANEOUS

ITEM No.	PART NAME	KNIGHT PART No.	NOTES
M1	Lamp		#12
M2	Switch		Selector (6 Position, Rotary Wafer Type)
M3	Switch		Stereo-Monaural (DPDT, Slide Type)
M4	Switch		Normal-Reverse (DPDT, Slide Type)
M5	Switch		Lo Filter-Off (DPDT, Slide Type)
M6	Switch		Hi Filter-Off (DPDT, Slide Type)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	*590K	4.7meg	0Ω	24Ω	12Ω	†590K	66K	680Ω	18Ω
V2	ECC83 12AX7	†170K	0Ω	2200Ω	200Ω	200Ω	†120K	68K	2200Ω	200Ω
V3	ECC82 12AU7	†70K	1meg	50K	700Ω	200Ω	†70K	1meg	50K	200Ω
V4	6V6GT	TP	200Ω	†190Ω	†2200Ω	470K	TP	200Ω	24Ω	
V5	6V6GT	TP	200Ω	†190Ω	†2200Ω	470K	TP	200Ω	24Ω	
V6	12AX7	*590K	66K	680Ω	12Ω	0Ω	†590K	4.7meg	0Ω	6Ω
V7	ECC83 12AX7	†170Ω	0Ω	2200Ω	200Ω	200Ω	†120K	68K	2200Ω	200Ω
V8	6V6GT	TP	200Ω	†190Ω	†2200Ω	470K	TP	200Ω	24Ω	
V9	6V6GT	TP	200Ω	†190Ω	†2200Ω	470K	TP	200Ω	24Ω	
V10	EZ81 6CA4	3.2Ω	NC	¶	200Ω	280Ω	NC	3.2Ω	NC	NC

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 3 OF V10.
* MEASURED FROM PIN 3 OF V5.
▲ MEASURED FROM PIN 8 OF V5.
NC NO CONNECTION
TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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KNIGHT MODEL KN-720 (92SU420)

PHOTOFACT* Folder

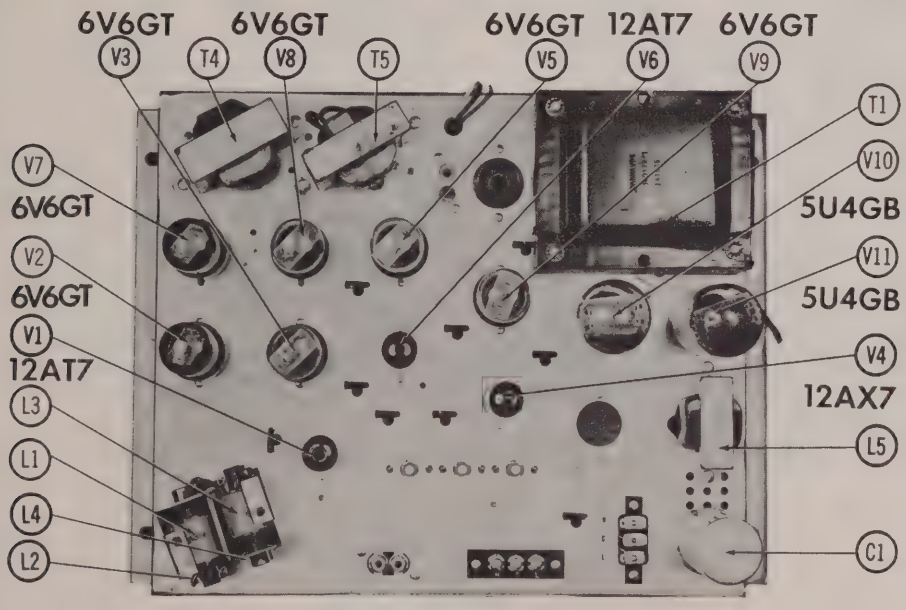
EIA ELECTRONIC INDUSTRIES ASSOCIATION MEMBER

MAGNAVOX CHASSIS
AMP-182BA

MAGNAVOX CHASSIS
AMP-182BA

TRADE NAME	Magnavox Chassis AMP-182BA
MANUFACTURER	Magnaovx Co., 2131 Bueter Road, Fort Wayne 4, Indiana
TYPE SET	AC Operated 11 Tube Stereo Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	110-120 Volts AC, 60 Cycle RATING 205 Watts, 1.9 Amp. @ 117 Volts AC

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE SIMILAR COLLARO RC-456 - PHOTOFACT SET 342 FOLDER 3 OR RECORD CHANGER MANUFAL RC-10



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

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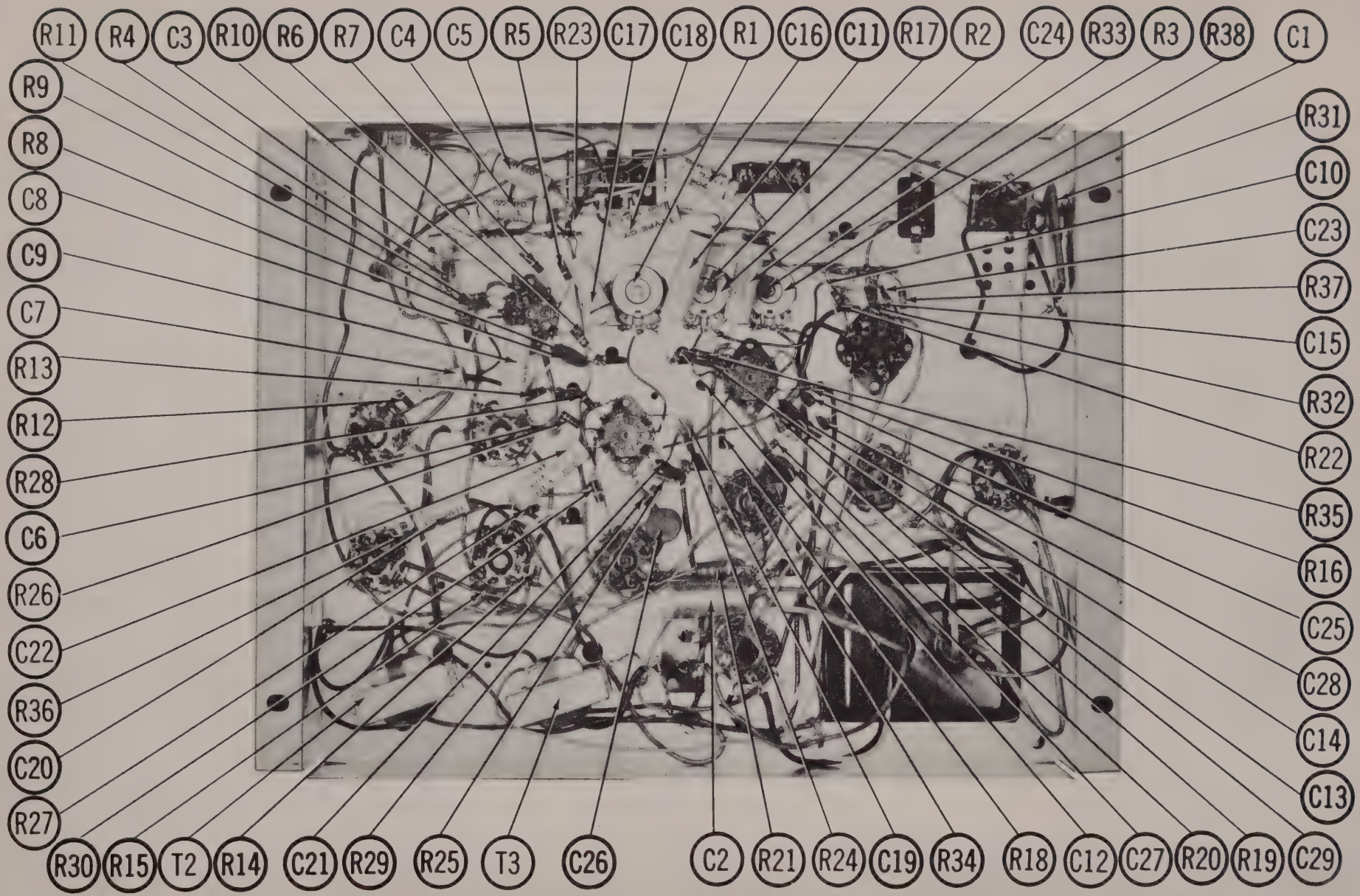
SET 450 FOLDER 9



CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Channel 1 Bass AF Amp. - Channel 1 Bass Phase Inv.	12AT7	
V2	Channel 1 Bass Output	6V6GT	
V3	Channel 1 Bass Output	6V6GT	
V4	Channel 1 Treble AF Amp. - Channel 2 Treble AF Amp.	12AX7	
V5	Channel 1 Treble Output	6V6GT	
V6	Channel 2 Bass AF Amp. - Channel 2 Bass Phase Inv.	12AT7	
V7	Channel 2 Bass Output	6V6GT	
V8	Channel 2 Bass Output	6V6GT	
V9	Channel 2 Treble Output	6V6GT	
V10	Rectifier	5U4GB	
V11	Rectifier	5U4GB	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MAGNAVOX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	200K	½	220132-22	B-46	A47-200K-S	Q11-129	U43	Channel 2 Bass
B	Shaft			Not Req.	FKS-1/2	Not Req.	Not Req.	
R2A	5000Ω	½	220132-25	B-10	A47-5000-S	Q11-114	U14	Channel 1 Treble
B	Shaft			Not Req.	FKS-1/2	Not Req.	Not Req.	
R3A	5000Ω	½	220132-25	B-10	A47-5000-S	Q11-114	U14	Channel 2 Treble
B	Shaft			Not Req.	FKS-1/2	Not Req.	Not Req.	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	MAGNAVOX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	▬40	450	270021-56	AFH4-78	D0640	FP429	TMQ-92	TVL-4734	
B	■30	450							
C	▲10	450							
D	20	25							
C2	20	25	270027-28 ①	SRE25V20	BBR20-25	TT25X20	TD-20-150	TVA-1410	

① Some versions may use 25mfd in this application (Part #270042-1).

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		MAGNAVOX PART No.	NOTES
	OHMS	WATT		
R4	10K		230104-74	
R5	100K		230104-86	
R6	100K		230104-86	
R7	220K		230104-90	
R8	1800Ω			Note 1
R9	22K		230104-78	
R10	220K		230104-90	
R11	5600Ω		230104-71	
R12	220K		230104-90	
R13	220K		230104-90	
R14	100Ω		230104-50	
R15	100Ω		230104-50	
R16	15K		230104-76	
R17	2200Ω		230104-66	
R18	150K		230104-88	
R19	1000Ω		230104-62	
R20	220K		230104-90	
R21	120Ω	2	230106-51	
R22	15K		230104-76	
R23	10K		230104-74	
R24	220K		230104-90	
R25	1800Ω			Note 1
R26	22K		230104-78	
R27	220K		230104-90	
R28	5600Ω		230104-71	
R29	220K		230104-90	
R30	220K		230104-90	
R31	125Ω	10	240071-6	
R32	15K		230104-76	
R33	2200Ω		230104-66	
R34	150K		230104-88	
R35	1000Ω		230104-62	
R36	220K		230104-90	
R37	15K		230104-76	
R38	8200Ω	1	230105-51	

Note 1. Some versions may use 1500Ω in this application (Part #230104-64).

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	.033	200		250202-10	P288N-033		CUB6S33	GEM-4133	6TM-S33	
C4	.022	200	10%	250202-9	V84C2S22		PM4S22	GTM-2122	2WF-S22	
C5	.033	200		250202-10	P288N-033		CUB6S33	GEM-4133	6TM-S33	
C6	220			250218-5	BPD-00022	DD-221	L10T22	B-322	5GA-T22	
C7	.01	400			P488N-01	D6-103	CUB4S1	GEM-411	4TM-S1	①
C8	10000			250218-19	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C9	.047	400		250211-11	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C10	1000			250218-28	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C11	.068	200		250202-12	P288N-068	DD16-702	CUB4S68	GEM-4168	4TM-S68	
C12	220			250218-5	BPD-00022	DD-221	L10T22	B-322	5GA-T22	
C13	10000			250218-19	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C14	10000			250218-19	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C15	68			250218-27	BPD-000068	DD-680	L10Q68	UC-5468	5GA-Q68	
C16	.033	200		250202-10	P288N-033		CUB6S33	GEM-4133	6TM-S33	
C17	.022	200	10%	250202-9	V84C2S22		PM4S22	GTM-2122	2WF-S22	
C18	.033	200		250202-10	P288N-033		CUB6S33	GEM-4133	6TM-S33	
C19	220			250218-5	BPD-00022	DD-221	L10T22	B-322	5GA-T22	
C20	.01	400			P488N-01	D6-103	CUB4S1	GEM-411	4TM-S1	①
C21	10000			250218-19	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C22	.047	400		250211-11	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C23	1000			250218-28	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C24	.068	200		250202-12	P288N-068	DD16-702	CUB4S68	GEM-4168	4TM-S68	
C25	220			250218-27	BPD-00022	DD-221	L10T22	B-322	5GA-T22	
C26	10000			250218-19	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C27	10000			250218-19	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C28	68			250218-7	BPD-000068	DD-680	L10Q68	UC-5468	5GA-Q68	
C29	10000	1400			DAC-27	DD16-103	HVE16S1	2HV-110	20HKB-S1	②

① Some versions may use .047mfd @ 400V in this application (Part #250211-11).
② May be part of a dual unit in some versions (Part #250219-3).

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		MAGNAVOX PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Crossover Fil. Choke	360639-1						725MH
L2	Crossover Fil. Choke	360639-1						725MH
L3	Crossover Fil. Choke	360639-1						725MH
L4	Crossover Fil. Choke	360639-1						725MH

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ∿)	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L5	.120A	56Ω	1 Hy.	320041-2	26C41	C-2994	F-804	C-2327	26C41	C-24X

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ 1.9A	640VCT @ .290A	5V @ 6A	300172-1						
	SEC. 3	SEC. 4	SEC. 5							
	6.3V @ 3.75A	6.3V	5.7V							

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	6000Ω CT	4-6Ω	320819-2	22S58	A-2935	AU-609	A-3870	22S58	S-55X	
T3	2700Ω	16Ω	320287-1	22S64	A-2902	AU-604	A-3849	24S64		
T4	6000Ω CT	4-6Ω	320819-2	22S58	A-2935	AU-609	A-3870	22S58	S-55X	
T5	2700Ω	16Ω	320287-1	24S64	A-2902	AU-604	A-3849	24S64		

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MAGNAVOX PART No.	QUAM PART No.	
SP1	15"	PM	4-6Ω	583976	15A10LZ5.5	
SP2	15"	PM	4-6Ω	583976	15A10LZ5.5	
SP3	4" x 10½"	PM	10-12Ω	580053		
SP4	4" x 10½"	PM	10-12Ω	580053		

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	MAGNAVOX PART No.	ASTATIC PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1		13-TB *				* Includes needles and mounting mechanism

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	MAGNAVOX PART No.	JENSEN PART No.	WALCO PART No.	
M2		†E-98 or ♦E-98D & †E-98X or ♦E-98XD	*† W101STS or *† ♦W101STD or *† W102S	* Includes Cartridge, less mounting mechanism † Jewel ♦ Diamond

MISCELLANEOUS

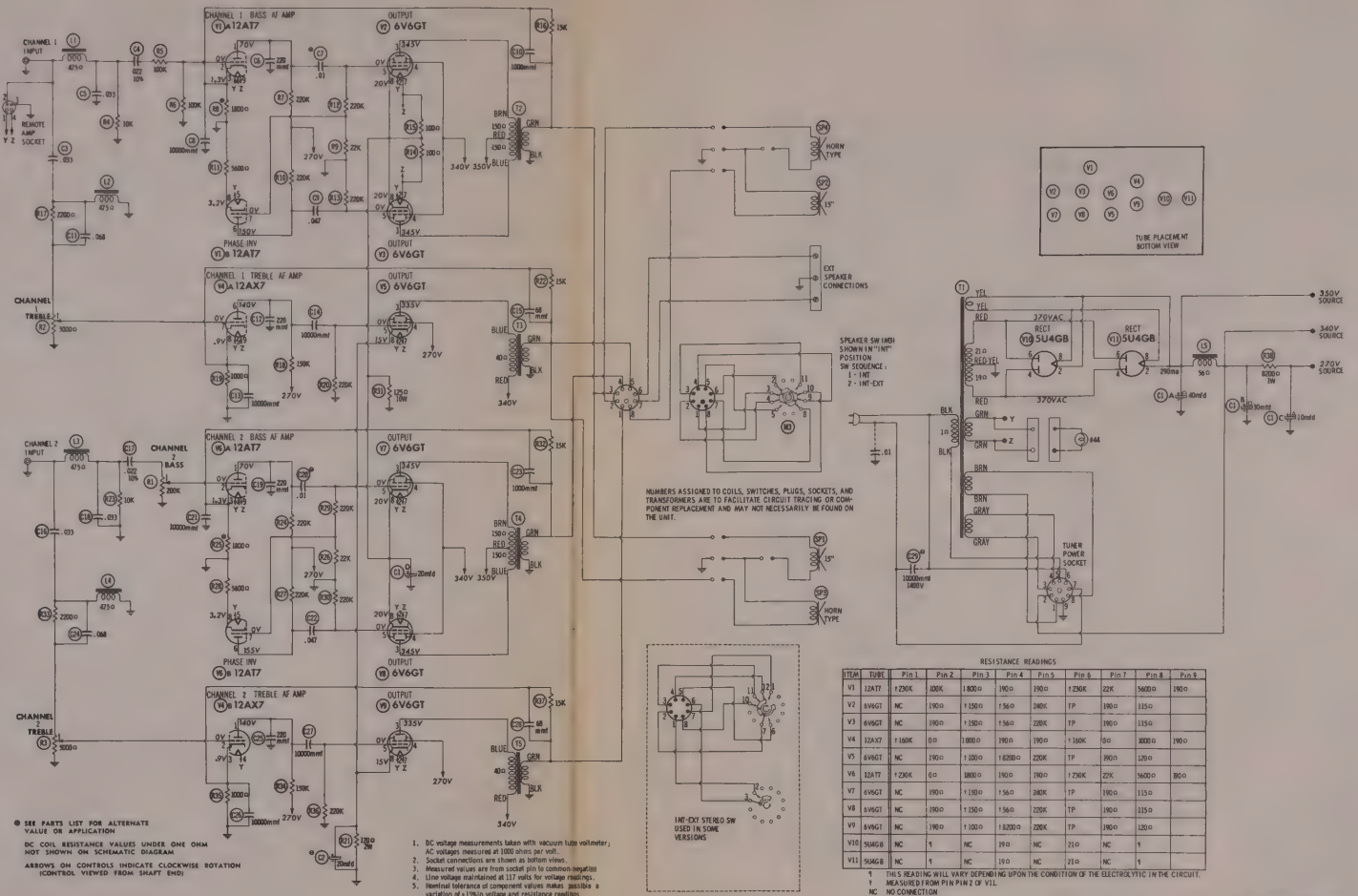
ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
M3	Switch		Speaker Selector (2 Position, Rotary Wafer Type)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No.	1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No.	8401
Phono Pick-up Arm Cable	Use BELDEN No.	8430 (Two Conductor - Twisted)


CHANNEL 1 BASS AF AMP
CHANNEL 1 INPUT
V1 A 12AT7
OUTPUT V2 6V6GT
PHASE INV V3 B 12AT7
OUTPUT V3 6V6GT
CHANNEL 1 TREBLE AF AMP
V4 A 12AX7
OUTPUT V5 6V6GT
CHANNEL TREBLE
CHANNEL 2 INPUT
CHANNEL 2 BASS
V6 A 12AT7
OUTPUT V7 6V6GT
PHASE INV V8 B 12AT7
OUTPUT V8 6V6GT
CHANNEL 2 TREBLE AF AMP
V9 A 12AX7
OUTPUT V9 6V6GT
CHANNEL TREBLE
REMOTE AMP SOCKET
HORN TYPE
15"
EXT SPEAKER CONNECTIONS
SPEAKER SW (M3) SHOWN IN "INT" POSITION
SW SEQUENCE : 1 - INT 2 - INT-EXT
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
INT-EXT STEREO SW USED IN SOME VERSIONS
TUBE PLACEMENT BOTTOM VIEW
370VAC
RECT V10 5U4GB
RECT V11 5U4GB
290ma
350V SOURCE
340V SOURCE
270V SOURCE
TUNER POWER SOCKET
PHOTOFACT STANDARD NOTATION SCHEMATIC
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MAGNAVOX CHASSIS AMP-ULTRA

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common-negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±10% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AT7	↑230K	100K	1800Ω	190Ω	190Ω	↑230K	22K	5600Ω	190Ω
V2	6V6GT	NC	190Ω	↑150Ω	↑56Ω	240K	TP	190Ω	115Ω	
V3	6V6GT	NC	190Ω	↑150Ω	↑56Ω	220K	TP	190Ω	115Ω	
V4	12AX7	↑160K	0Ω	1800Ω	190Ω	190Ω	↑160K	0Ω	1000Ω	190Ω
V5	6V6GT	NC	190Ω	↑100Ω	↑8200Ω	220K	TP	190Ω	120Ω	
V6	12AT7	↑230K	0Ω	1800Ω	190Ω	190Ω	↑230K	22K	5600Ω	190Ω
V7	6V6GT	NC	190Ω	↑150Ω	↑56Ω	240K	TP	190Ω	115Ω	
V8	6V6GT	NC	190Ω	↑150Ω	↑56Ω	220K	TP	190Ω	115Ω	
V9	6V6GT	NC	190Ω	↑100Ω	↑8200Ω	220K	TP	190Ω	120Ω	
V10	5U4GB	NC	¶	NC	190Ω	NC	210Ω	NC	¶	
V11	5U4GB	NC	¶	NC	190Ω	NC	210Ω	NC	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
↑ MEASURED FROM PIN PIN 2 OF V1L
NC NO CONNECTION
TP TIE POINT

PHOTOFACT* Folder

NEWCOMB MODEL
E-10-M

NEWCOMB MODEL
E-10-M

NEWCOMB MODEL
E-10-M

TRADE NAME	Newcomb Model E-10-M
MANUFACTURER	Newcomb Audio Products Co., 6824 Lexington Ave., Hollywood 38, California
TYPE SET	AC-Battery Operated 5 Tube Audio Amplifier
POWER SUPPLY	110-120 Volts AC, 60 Cycle 6 Volt Storage Battery RATING 55 Watts, .52 Amp. @ 117 Volts AC 7.5 Amp. @ 6.3 Volts DC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

J115

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Mike Preamp. -Phase Inv.	6SC7	
V2	AF Amp.	6SF5	
V3	Output	6V6GT	

ITEM No.	USE	TYPE	NOTES
V4	Output	6V6GT	
V5	Rectifier	6X5GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	NEWCOMB PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	▬20	475	CE-30	AFH4-19-10	D0179.3	FP474.5	TMQ-123	TVLS-4825 *	
B	■10	475				TC36			
C	▲10	475							
D	25	50							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	NEWCOMB PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C3	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C4	.01	600			P688N-01	DD-103	CUB3S1	GEM-611	6TM-S1	
C5	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C6	.022	600			P688N-022	DD-203	CUB6S22	GEM-6122	6TM-S22	
C7	.022	600			P688N-022	DD-203	CUB6S22	GEM-6122	6TM-S22	
C8	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C9	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C10	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C11	.01	1600			VBC-01	DD16-103	PJ16S1	GEM-1611	MB-S1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	NEWCOMB PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1meg	1/2	RV-83 ①	BT-71	A47F5-1meg	QVC-539X	UT-443	Volume, Tap ② 500K
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	① Alternate Part #RV-42.

RESISTORS

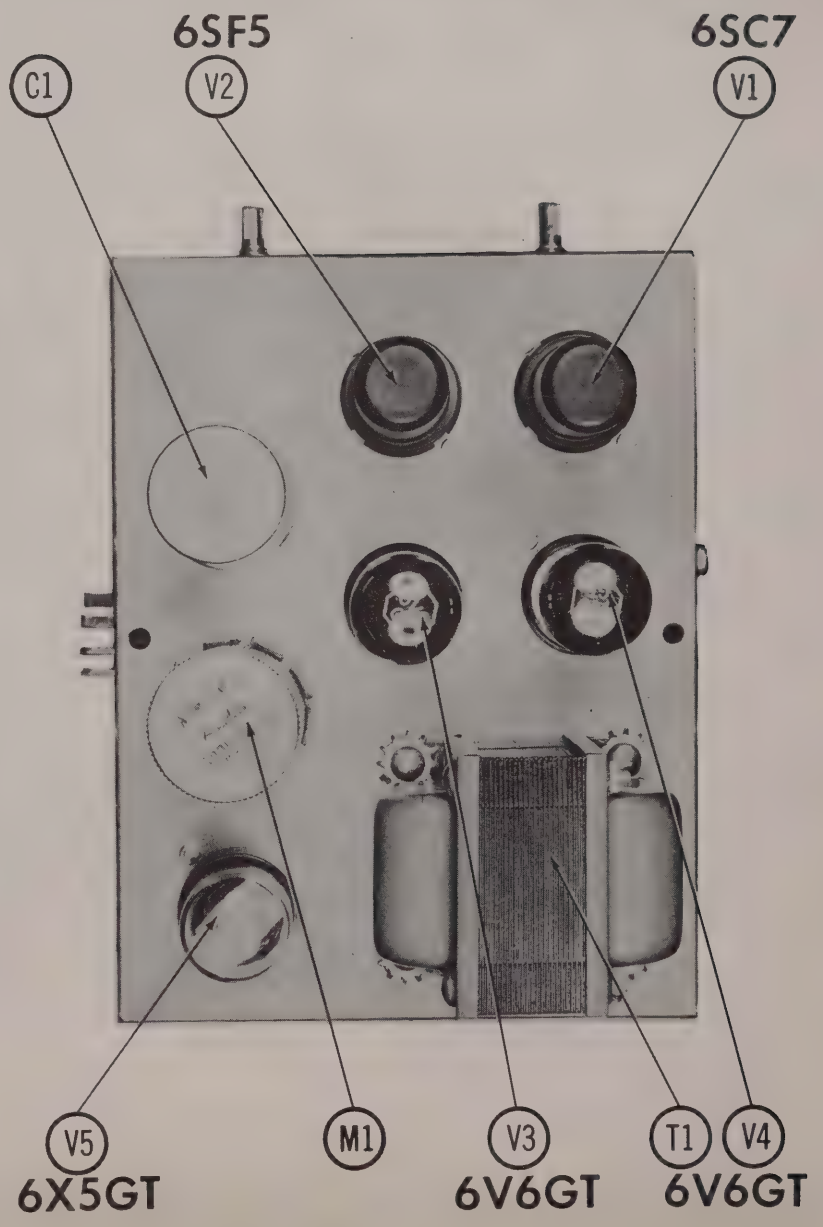
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		NEWCOMB PART No.	NOTES
	OHMS	WATT		
R2	4.7meg			
R3	560K			
R4	4.7meg			
R5	560K			
R6	100Ω			
R7	8200Ω			
R8	4.7meg			
R9	560K			
R10	560K			

ITEM No.	RATING		NEWCOMB PART No.	NOTES
	OHMS	WATT		
R11	12K			
R12	300Ω 5%	2		
R13	560K			
R14	56K			
R15	2200Ω	1		
R16	100Ω			
R17	100Ω			
R18	68Ω 5%	1		Note 1
R19	100Ω			

Note 1. Not used in some versions.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING AC OPERATION			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	NEWCOMB PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .52A	620VCT @ .070A	10V not used tap @ 6.3V @ 2.3A tap @ 2.5V Not used	TR-133						
	SEC. 3	SEC. 4								
	DC OPERATION									
	PRI.		SEC. 1							
	9V not used tap @ 6VCT @ 6A		250VCT @ .068A							
	SEC. 2									
	115V Not used									

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	NEWCOMB PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	7300Ω CT	16Ω tap @ 8Ω, 4Ω	TR-134	26S59	A-3027	AU-609	A-3870	26S59	S-55X	

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				NEWCOMB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	6V	115∿	VA-5	5715	1501	5715	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			NEWCOMB PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	3AG	1A 250V S/B	①		313001. (3AG 1A 250V S/B)	357001	MDL 1	4406

① Not used in some versions.

MISCELLANEOUS

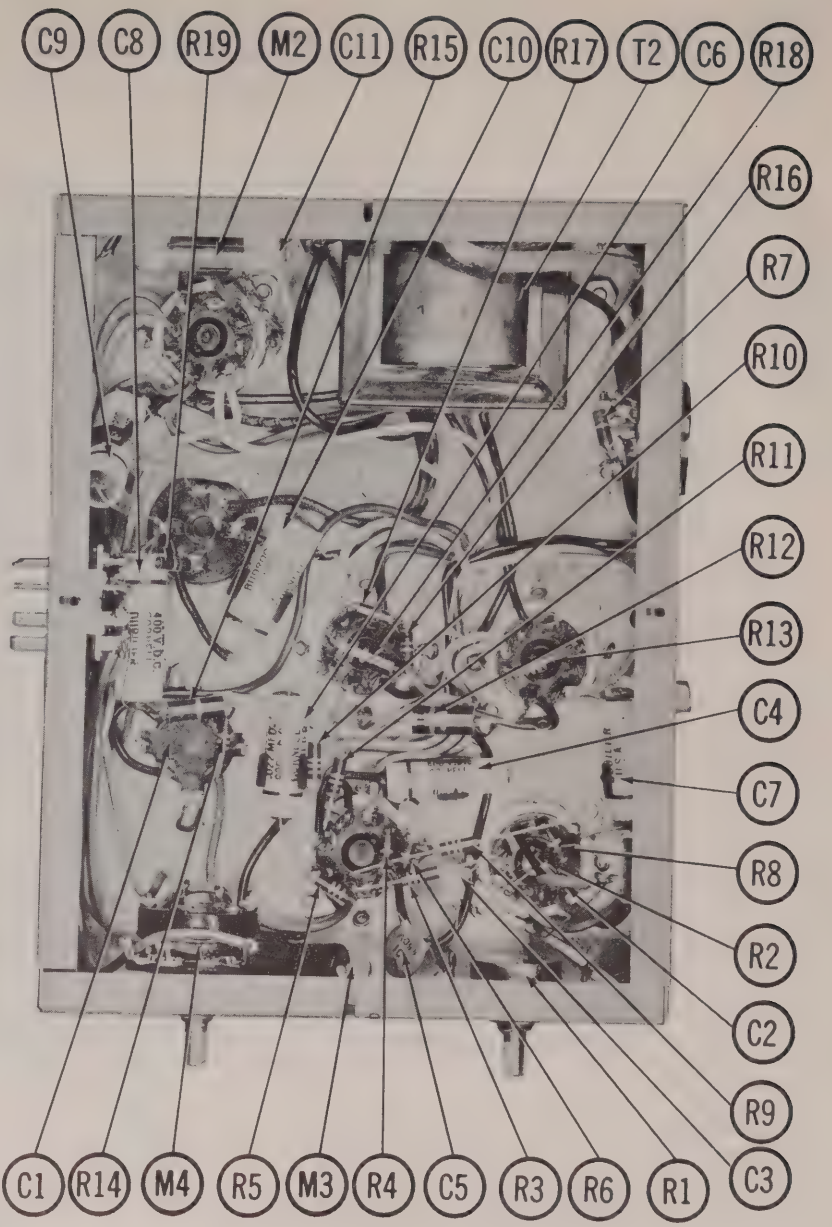
ITEM No.	PART NAME	NEWCOMB PART No.	NOTES
M3	Lamp		#51 (Not used in some versions)
M4	Switch	SY-68	On-Standby-Off (Rotary Wafer Type) Includes Power On-Off (SPST, Rotary Snap Type)

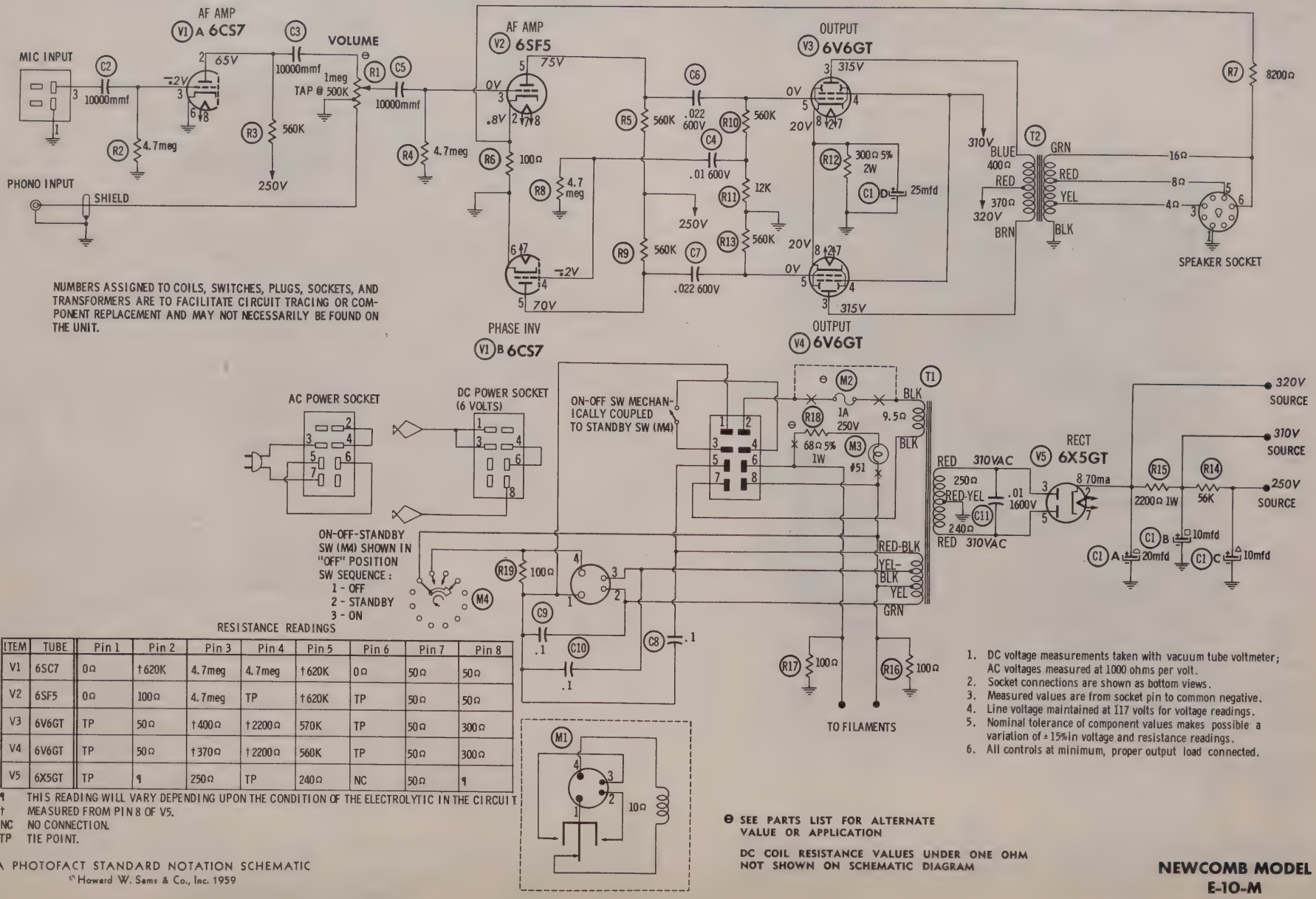
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW





NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V1	6SC7	0Ω	†620K	4.7meg	4.7meg	†620K	0Ω	50Ω	50Ω
V2	6SF5	0Ω	100Ω	4.7meg	TP	†620K	TP	50Ω	50Ω
V3	6V6GT	TP	50Ω	†400Ω	†2200Ω	570K	TP	50Ω	300Ω
V4	6V6GT	TP	50Ω	†370Ω	†2200Ω	560K	TP	50Ω	300Ω
V5	6X5GT	TP	¶	250Ω	TP	240Ω	NC	50Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 8 OF V5.
NC NO CONNECTION.
TP TIE POINT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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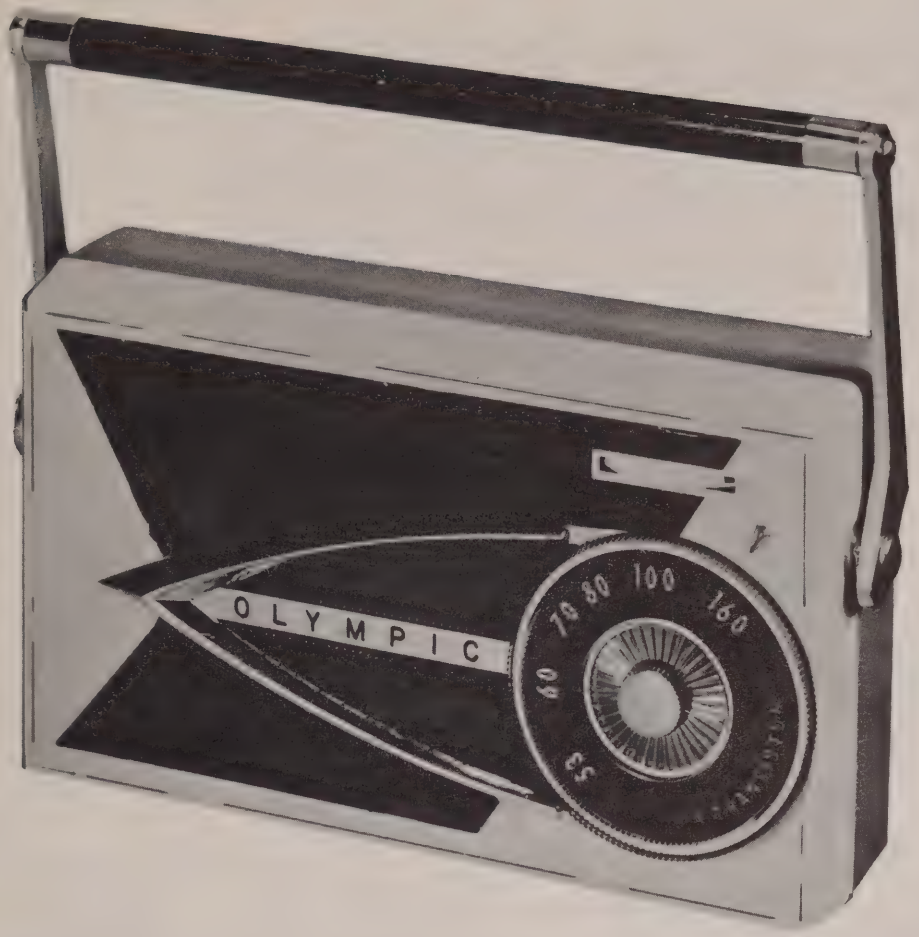
NEWCOMB MODEL E-10-M

PHOTOFACT* Folder with CIRCUITRACE*
EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

OLYMPIC MODEL 771

OLYMPIC MODEL 771



OLYMPIC MODEL 771

TRADE NAME	Olympic Model 771
MANUFACTURER	Olympic Radio & Tel. Corp., 34-01 38th Ave., Long Island City 1, N. Y.
TYPE SET	Battery Operated Portable Transistorized AM Receiver
POWER SUPPLY	6 Volts DC
TUNING RANGE—BROADCAST	535KC — 1650KC
RATING	5.1MA @ 6 Volts DC (No Signal, Min. Volume) 8 MA @ 6 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools: A4 & A6..... GENERAL CEMENT #5000, 5003, 8276, 8290
WALSCO #2512, 2525

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	565KC (400∿ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1650KC	"	"	A4	Adjust for maximum output.
3.		"	600KC	600KC	"	A5	"
4.		"	1400KC	1400KC signal	"	A6	"

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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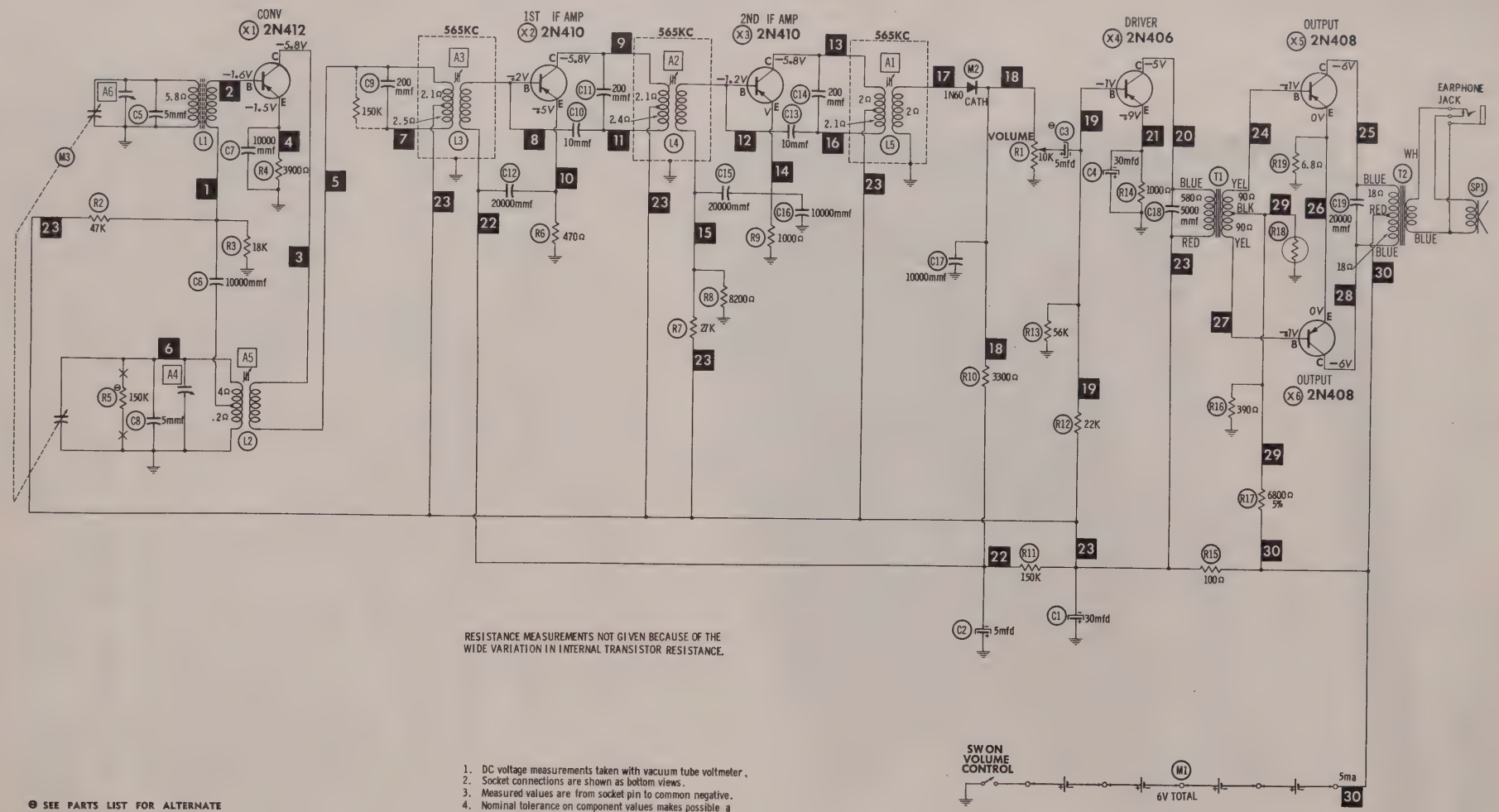
SET 450 FOLDER 11



Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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OLYMPIC MODEL 771

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N412	Converter		2N412	2N486	2N412	PNP
X2	2N410	1st IF Amplifier		2N410	2N483	2N410	PNP
X3	2N410	2nd IF Amplifier		2N410	2N483	2N410	PNP
X4	2N406	Driver		2N406	2N362	2N406	PNP
X5	2N408	Output		2N408	2N632	2N408	PNP
X6	2N408	Output		2N408	2N632	2N408	PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	OLYMPIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	30	12	C0J30032	XPP-12030	NLW30-15	TT15X30	ML30-15	TE-1158	
C2	5	6		XPP-6005	NLW5-6	TT6X5	ML5-6	TE-1084	
C3	5	3	①	XPP-3005	NLW5-6	TT6X5	ML5-6	TE-1053	
C4	30	6		PWE6030	EC30-6	TT6X30	ML30-6	TE-1092	

① Some versions may use 10mfd in this application.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	5				DI 5	D6-050	C10V5		5GA-V5	
C6	10000	3			C-80V103AM	DM-103	H-05S1	TA-110	TG-S10	
C7	10000	3			C-80V103AM	DM-103	H-05S1	TA-110	TG-S10	
C8	5				DI 5	D6-050	C10V5		5GA-V5	
C9	200				SI 200	D6-201	L10T2		5GA-T2	
C10	10				SI 10	D6-100	C10Q1	UC-541	5GA-Q1	
C11	200				SI 200	D6-201	L10T2		5GA-T2	
C12	20000	50			C-80V203AM	DDM-203	H-05S2	TA-120	TG-S20	
C13	10				SI 10	D6-100	C10Q1	UC-541	5GA-Q1	
C14	200				SI 200	D6-201	L10T2		5GA-T2	
C15	20000				C-80V203AM	DDM-203	H-05S2	TA-120	TG-S20	
C16	10000				C-80V103AM	DM-103	H-05S1	TA-110	TG-S10	
C17	10000	6			C-80V103AM	DM-103	H-05S1	TA-110	TG-S10	
C18	5000				C-80V502AM	DDA-503	H-05D5	TA-250	TG-D50	
C19	20000	50			C-80V203AM	DDM-203	H-05S2	TA-120	TG-S20	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	OLYMPIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	10K	1/4	PTJ25231					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

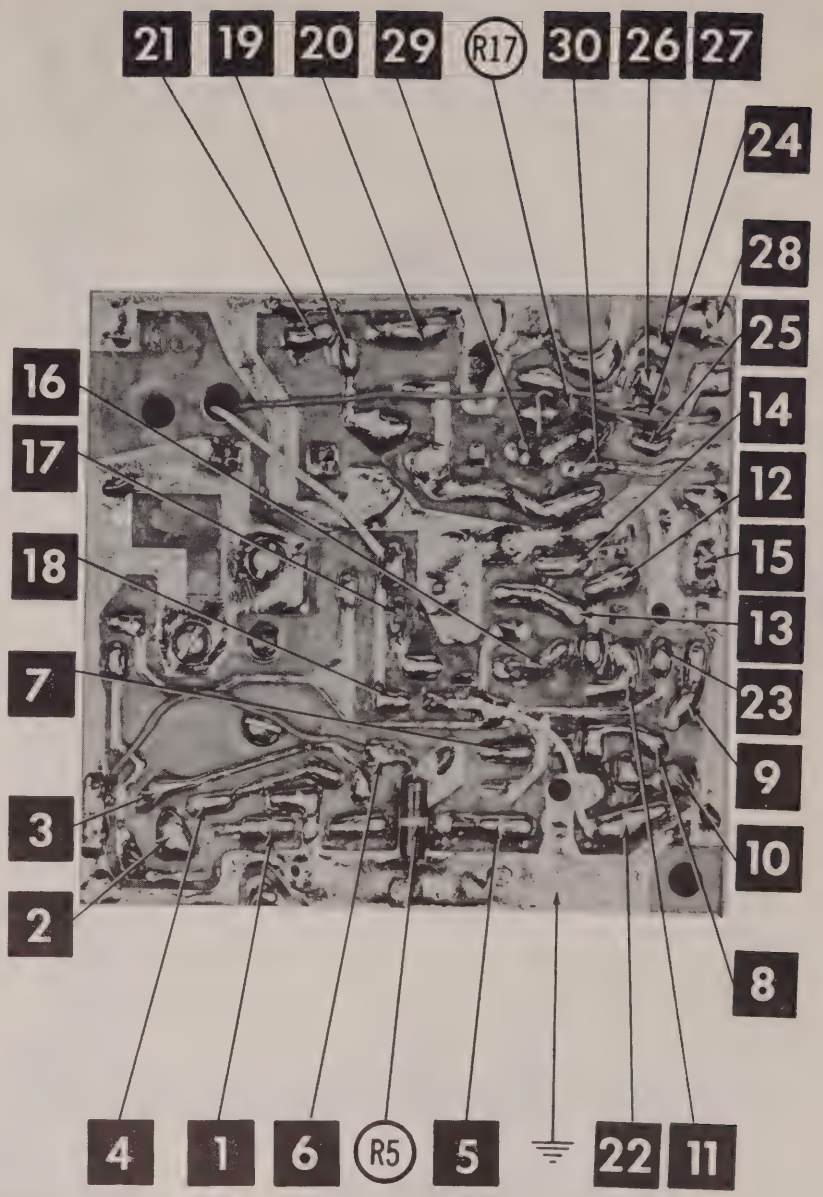
ITEM No.	RATING		OLYMPIC PART No.	NOTES
	OHMS	WATT		
R2	47K			Note 1
R3	18K			
R4	3900Ω			
R5	150K			
R6	470Ω			
R7	27K			
R8	8200Ω			
R9	1000Ω			
R10	3300Ω			

Note 1. Not used in some versions.

ITEM No.	RATING		OLYMPIC PART No.	NOTES
	OHMS	WATT		
R11	150K			
R12	22K			
R13	56K			
R14	1000Ω			
R15	100Ω			
R16	390Ω			
R17	6800Ω 5%			Temp. Comp.
R18				
R19	6.8Ω			

PRINTED BOARD

A Howard W. Sams CIRCUITRACE* Photo



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		OLYMPIC PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	LPJ25230						
L2	Osc. Coil	CLJ25133						
L3	1st IF Trans.	TRJ25137						
L4	2nd IF Trans.	TRJ25138						
L5	3rd IF Trans.	TRJ25139						

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3.5:	1	TRJ30031						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	600Ω CT	14Ω	TRJ30030	TR-20			TA-23	TR-20		

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	OLYMPIC PART No.	QUAM PART No.	
SP1	2½"	PM	14Ω	SKJ30035	25A07Z14	

BATTERIES

ITEM No.	VOLTAGE	OLYMPIC PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	6V			Z①		1015① E9 ②		M-15R① ZM9 ②	① 4 Used ② Mercury Type, 4 Used

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		OLYMPIC PART No.	CBS PART No.	SYLVANIA PART No.	
M2			1N60	1N60	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	OLYMPIC PART No.	NOTES
M3	Tuning Cap Printed Board	CVJ-25232 190	2 Gang

CABINETS & CABINET PARTS

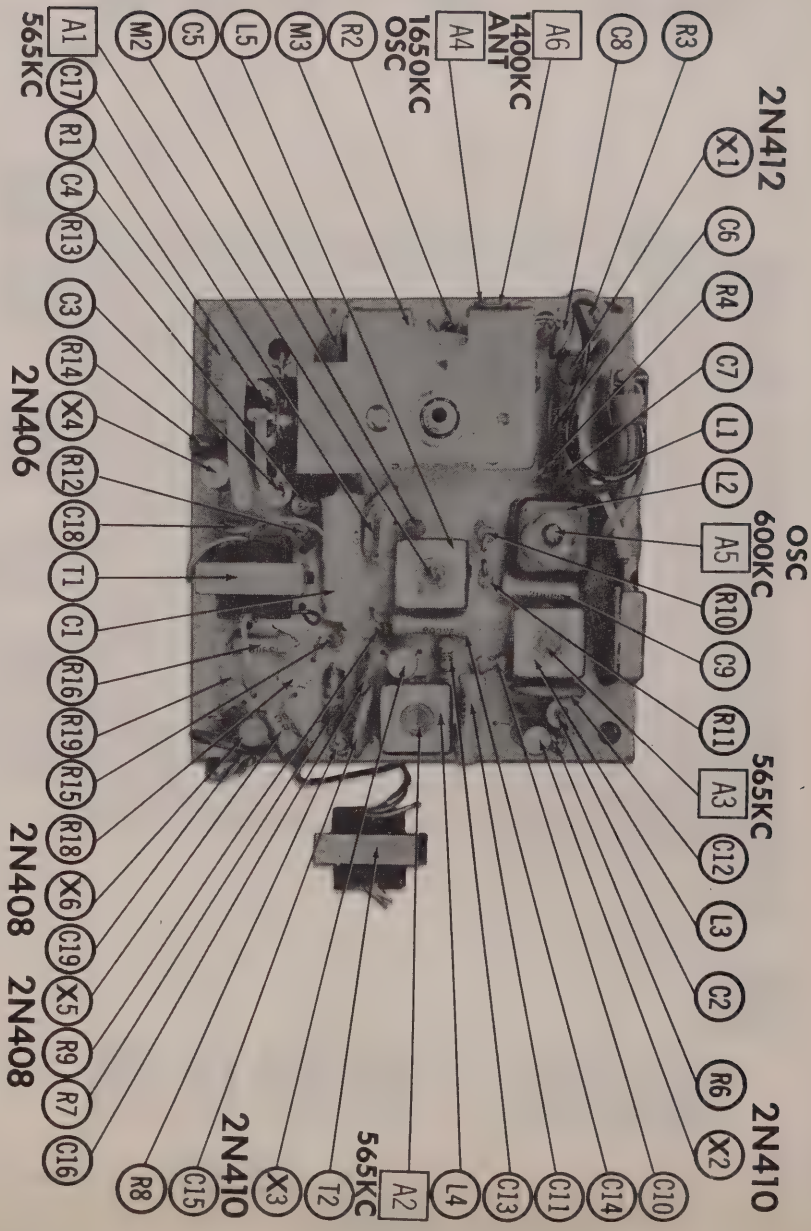
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	KNJ25226	Tuning
Knob	KNJ25228	Volume-On-Off
Screw	SCJ25227	Tuning Knob
Cabinet Front	CAJ25224	Includes Decoration And Accessories
Cabinet Back	CAJ25225	Includes Handle And Trap Door Assembly

WIRING DATA

General-use Unshielded Hook-up Wire .....: Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



PHOTOFACT* Folder

**PILOT MODELS
P-1060, M**

PILOT MODELS
P-1060, M

MODEL P-1060M

TRADE NAME	Pilot Model P-1060, P-1060M
MANUFACTURER	Pilot Radio Corp., 37-06 36th St., Long Island City 1, N. Y.
TYPE SET	AC Operated 9 Tube Stereo Amplifier with 4 Speed Automatic Record Changer
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 100 Watts, .9 Amp. @ 117 Volts AC

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE GARRARD RC-121 - PHOTOFACT SET 421 FOLDER 7.

PILOT MODELS
P-1060, M

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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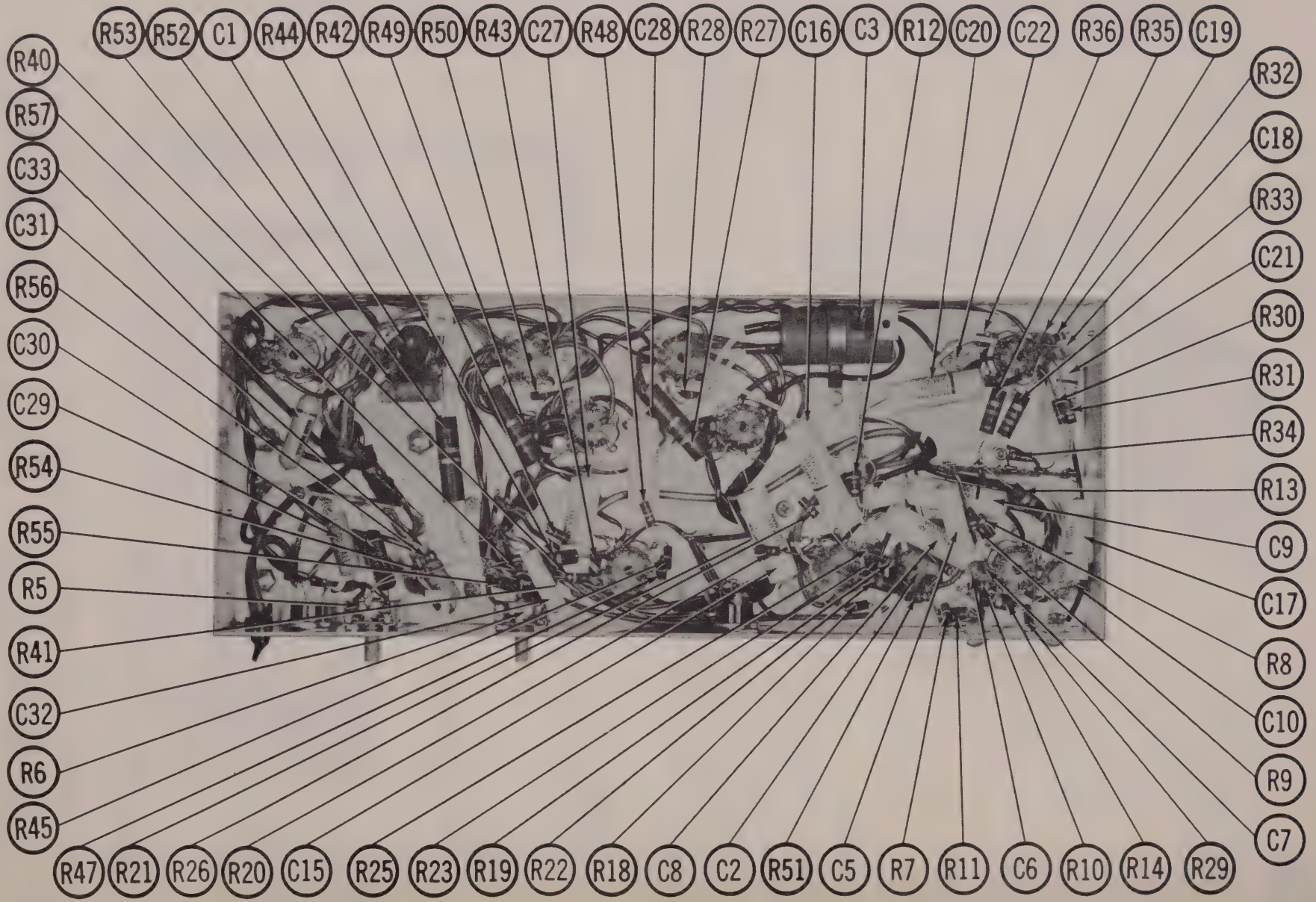
J125

SET 450 FOLDER 12



CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	Notes
V1	Channel A Phono Preamp-		
	Channel A AF Amp.	7025	①
V2	Channel A AF Amp. -		
	Channel A Phase Inv.	12AX7	
V3	Channel A Output	EL84/6BQ5	
V4	Channel A Output	EL84/6BQ5	

ITEM No.	USE	TYPE	Notes
V5	Channel B Phono Preamp-		
	Channel B AF Amp.	7025	①
V6	Channel B AF Amp. -		
	Channel B Phase Inv.	12AX7	
V7	Channel B Output	EL84/6BQ5	
V8	Channel B Output	EL84/6BQ5	
V9	Rectifier	EZ81/6CA4	

① Alternate 12AX7.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA PILOT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	350	24-158	AFH2-40-80	B0326	FP227.5	TMD-58	TVL-2634	
B	▲80	350							
C2A	■20	300	24-169	AFH4-44	D0367	FP430.2	TMQ-56	TVAS-4560.1*	
B	▲40	300							
C	▲25	10							
D	25	10							
C3A	100	25	24-170	PRS150V100	BBR100-25 †	TCD2155	TD-100-25 †	TVAS-2220 *	
B	100	25		100	BBR100-25		TD-100-25		
C4	2	50NP	22-173	NP-PRS50V2	BBR4-50	TCN502		TVAS-1301.1*	
					BBR4-50 †				

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
† Connect negative leads together.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA PILOT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	.1	200			P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C6	680		10%		DI-680	D6-681	1R5T68	JL-368	5GA-T68S 10% *	
C7	150		N750 10%		N750-DI 150	TCN-150	C10T15U	CN7-315	5TCU-T15S 10% *	
C8	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C9	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C10	3300		10%		DI-3300		1R5D33	JL-233	5GA-D33S 10% *	
C11	220		10%		DI-220	D6-221	L10T22	JL-322	5GA-T22S 10% *	
C12	500		10%		DI-500		5R5T5		5GA-T5S 10% *	
C13	1500		10%		DI-1500		1R5D15	JL-215	5GA-D15S 10% *	
C14	2700		10%		DI-2700		1R5D27		5GA-D27S 10% *	
C15	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C16	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C17	.1	200			P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C18	680		10%		DI-680	D6-681	1R5T68	JL-368	5GA-T68S 10% *	
C19	150		N750 10%		N750-DI 150	TCN-150	C10T15U	CN7-315	5TCU-T15S 10% *	
C20	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C21	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C22	3300		10%		DI-3300		1R5D33	JL-233	5GA-D33S 10% *	
C23	220		10%		DI-220	D6-221	L10T22	JL-322	5GA-T22S 10% *	
C24	500		10%		DI-500		5R5T5		5GA-T5S 10% *	
C25	1500		10%		DI-1500		1R5D15	JL-215	5GA-D15S 10% *	
C26	2700		10%		DI-2700		1R5D27		5GA-D27S 10% *	
C27	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C28	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C29	.01	400			P488N-01	DD-103	CUB4S1	GEM-411	4TM-S1	
C30	.015	200			P288N-015	DD-103	CUB2S15	GEM-4115	4TM-S15	
C31	.01	400			P488N-01	DD-103	CUB4S1	GEM-411	4TM-S1	
C32	.01	400			P488N-01	DD-103	CUB4S1	GEM-411	4TM-S1	
C33	.01	600			P688N-01	DD-103	CUB6S1	GEM-611	6TM-S1	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA PILOT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	250K		36-72	B-51	AD47-250K-Z	Q13-130		Volume, Channel A
B	250K			SR-51		M13-130		Volume, Channel B
C	Shaft			Not Req.	FS-3	Not Req.	■ UE1396S	
D	Switch			KR-1	SWE-12	76-1		
R2A	250K		39-58				† UE137I	Balance, Channel A
B	250K							Balance, Channel B
R3A	5meg		37-37	B-88		Q13-141	‡	Treble, Channel A
B	5meg			SR-88		M13-141		Treble, Channel B
R4A	5meg		37-37	B-88		Q13-141	‡	Bass, Channel A
B	5meg			SR-88		M13-141		Bass, Channel B
R5A	25K		39-44	AB-26	B47-25K-S	B11-120	TA253L	Hum Balance, Channel A
B	Shaft			AK-1	Not Req.	SK-2	Not Req.	
R6A	25K		39-44	AB-26	B47-25K-S	B11-120	TA253L	Hum Balance, Channel B
B	Shaft			AK-1	Not Req.	SK-2	Not Req.	

■ "STA-LOC" Equivalent: FA254A, RU254A, CS3500, US-41.
† "STA-LOC" Equivalent: FA254A, RU254R, CS-3500.
‡ "STA-LOC" Equivalent: FA56A, RU56A, CS3500.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	PILOT PART No.	NOTES
R7	39K			
R8	2.2meg			
R9	100K 5%			
R10	470K 5%			
R11	68K	2		
R12	4.7meg			
R13	82K	2		
R14	3300Ω	2		
R15	22K			
R16	82K			
R17	68K			
R18	100K			
R19	100K 5%			
R20	12K			
R21	330Ω			
R22	82K	2		
R23	12K 5%			
R24	100K 5%			
R25	1500Ω			
R26	270K 5%			
R27	180Ω 5%	3		
R28	270K 5%			
R29	39K			
R30	2.2meg			
R31	100K 5%			
R32	470K 5%			

ITEM No.	RATING OHMS	RATING WATT	PILOT PART No.	NOTES
R33	68K	2		
R34	4.7meg			
R35	82K	2		
R36	3300Ω	2		
R37	22K			
R38	82K			
R39	68K			
R40	100K			
R41	100K 5%			
R42	12K			
R43	330Ω			
R44	82K	2		
R45	12K 5%			
R46	100K 5%			
R47	1500Ω			
R48	270K 5%			
R49	180Ω 5%	3		
R50	270K 5%			
R51	15K			
R52	10K	3		
R53	100Ω	4	31-142	
R54	330K			
R55	330K			
R56	47K			
R57	47K			
R58	4.7Ω	1		

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA PILOT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @.9A	540VCT @.130A	6.3VCT @3.3A	55-66						
	SEC. 3	SEC. 4	SEC. 5							
	6.3VCT @2.5A									

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	PILOT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	7000Ω CT	6-8Ω	56-58							
T3	7000Ω CT	6-8Ω	56-58							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	PILOT PART No.	QUAM PART No.	
SP1	8"	PM	6-8Ω	41-39A ①	8A31Z7.9	① Letter "A" may be omitted.
SP2	6"	PM	3-4Ω	41-40A ①	6A21	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	PILOT PART No.	ASTATIC PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1						

MISCELLANEOUS

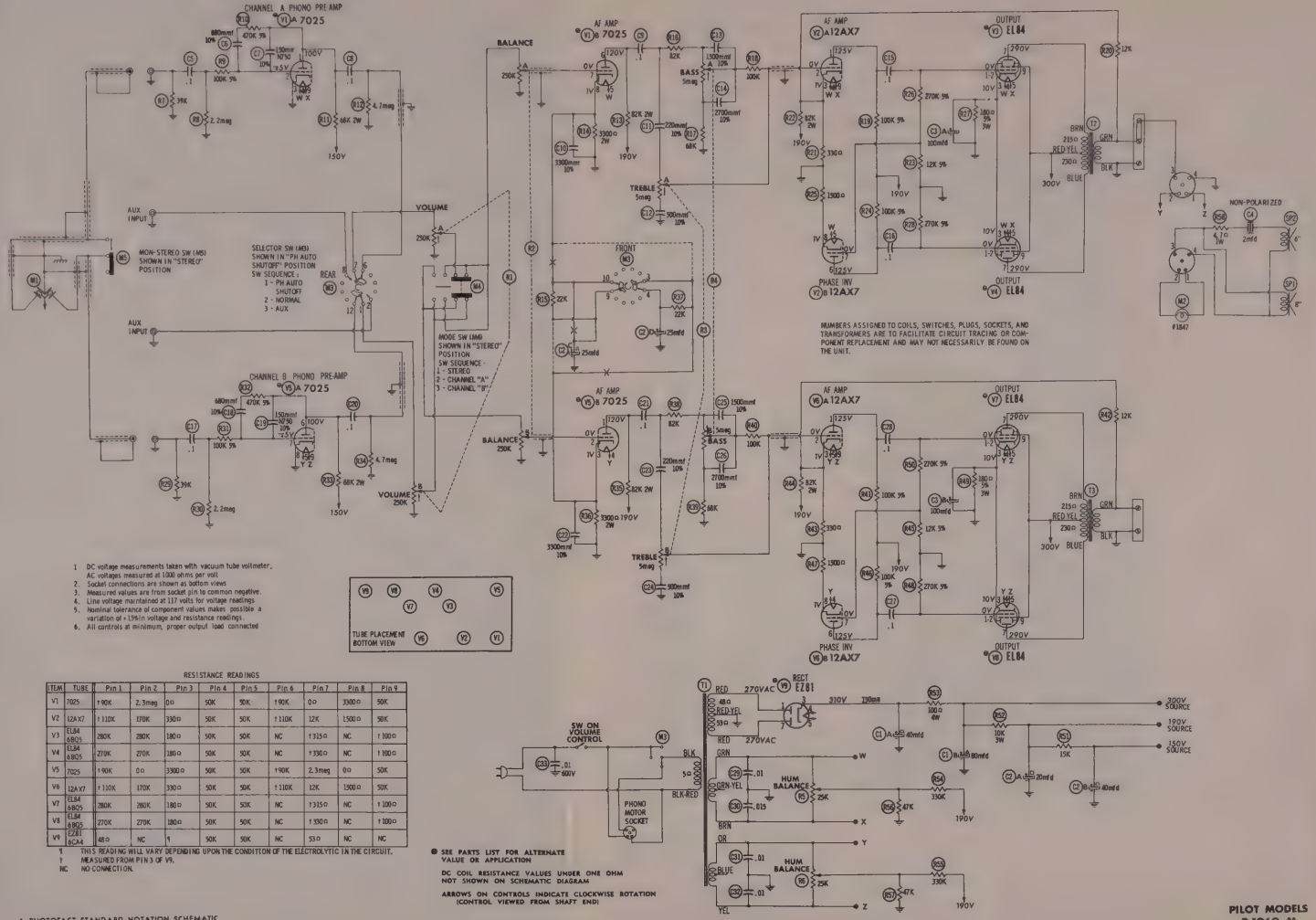
ITEM No.	PART NAME	PILOT PART No.	NOTES
M2	Lamp		#1847
M3	Switch	100-133	Selector (3 Position, Rotary Wafer Type) Includes Power On-Off (SP3T, Rotary Snap Type)
M4	Switch	101-45	Mode, Stereo-Ch. A - Ch. B (DP3T, Slide Type)
M5	Switch		Monaural-Stereo (SPDT, Slide Type)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No.	1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No.	8401
Phono Pick-up Arm Cable	Use BELDEN No.	8430 (Two Conductor - Twisted)



1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	7025	†90K	2.3meg	0Ω	50K	50K	†90K	0Ω	3300Ω	50K
V2	12AX7	†110K	170K	330Ω	50K	50K	†110K	12K	1500Ω	50K
V3	EL84 6BQ5	280K	280K	180Ω	50K	50K	NC	†315Ω	NC	†100Ω
V4	EL84 6BQ5	270K	270K	180Ω	50K	50K	NC	†330Ω	NC	†100Ω
V5	7025	†90K	0Ω	3300Ω	50K	50K	†90K	2.3meg	0Ω	50K
V6	12AX7	†110K	170K	330Ω	50K	50K	†110K	12K	1500Ω	50K
V7	EL84 6BQ5	280K	280K	180Ω	50K	50K	NC	†315Ω	NC	†100Ω
V8	EL84 6BQ5	270K	270K	180Ω	50K	50K	NC	†330Ω	NC	†100Ω
V9	EZ81 6CA4	48Ω	NC	¶	50K	50K	NC	53Ω	NC	NC

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 3 OF V9.
NC NO CONNECTION.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PILOT MODELS P-1060, M

PHOTOFACT* Folder

RCA VICTOR MODEL
SES6 (Ch. RS-175)

RCA VICTOR MODEL
SES6 (Ch. RS-175)

RCA VICTOR MODEL
SES6 (Ch. RS-175)

TRADE NAME	RCA Victor Models SES-6 (Ch. RS-175)
MANUFACTURER	RCA Victor Radio & "Victrola" Div., Radio Corp. of America, Camden 8, N.J.
TYPE SET	AC Operated 3 Tube Stereo Amplifier with 4 Speed Automatic Record Changer
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 31 Watts, .33 Amp. @ 117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER RP-205H-2 - SEE RCA RP-205 Series - PHOTOFACT SET 358 FOLDER 10 OR RECORD CHANGER MANUAL RC-10.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Right Channel AF Amp. - Left Channel AF Amp.	12AX7	

ITEM No.	USE	TYPE	NOTES
V2	Right Channel Output	50EH5	
V3	Left Channel Output	50EH5	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	RCA Victor PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	80	150	101752	PRS150V8020	BBRT53215	WT217	TDLD-10	TVLS-2440. 8*	
B	20	150							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	2200			77953	BPD-0022	DD-222	BYA10D22	B-222	5HK-D22	
C3	4700			103905	BPD-0047	DD-472	BYA10D47	B-247	5HK-D47	
C4	10000			73960	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C5	2200			77953	BPD-0022	DD-222	BYA10D22	B-222	5HK-D22	
C6	4700			103905	BPD-0047	DD-472	BYA10D47	B-247	5HK-D47	
C7	10000			73960	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C8	.047	400		73553	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C9	.047	400		73553	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	RCA Victor PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	5meg	1/2	106969	B-88	AD47-5meg-S	Q11-141	† UE3967	Volume, Right Channel
B	5meg	1/2		SR-88	Not Req.	M11-141		Volume, Left Channel
C	Shaft			Not Req.	KSS-3	Not Req.		
R2A	2meg	1/2	106968	B-76	AD47-2meg-S	Q13-139	‡ UE1877	Tone, Right Channel
B	2meg	1/2		SR-76	Not Req.	M13-139		Tone, Left Channel
C	Shaft			Not Req.	KSS-3	Not Req.		

† "STA-LOC" Equivalent: FA56A, RU56A, CS3500. ‡ "STA-LOC" Equivalent: FA26A, RU26A, CS3500.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

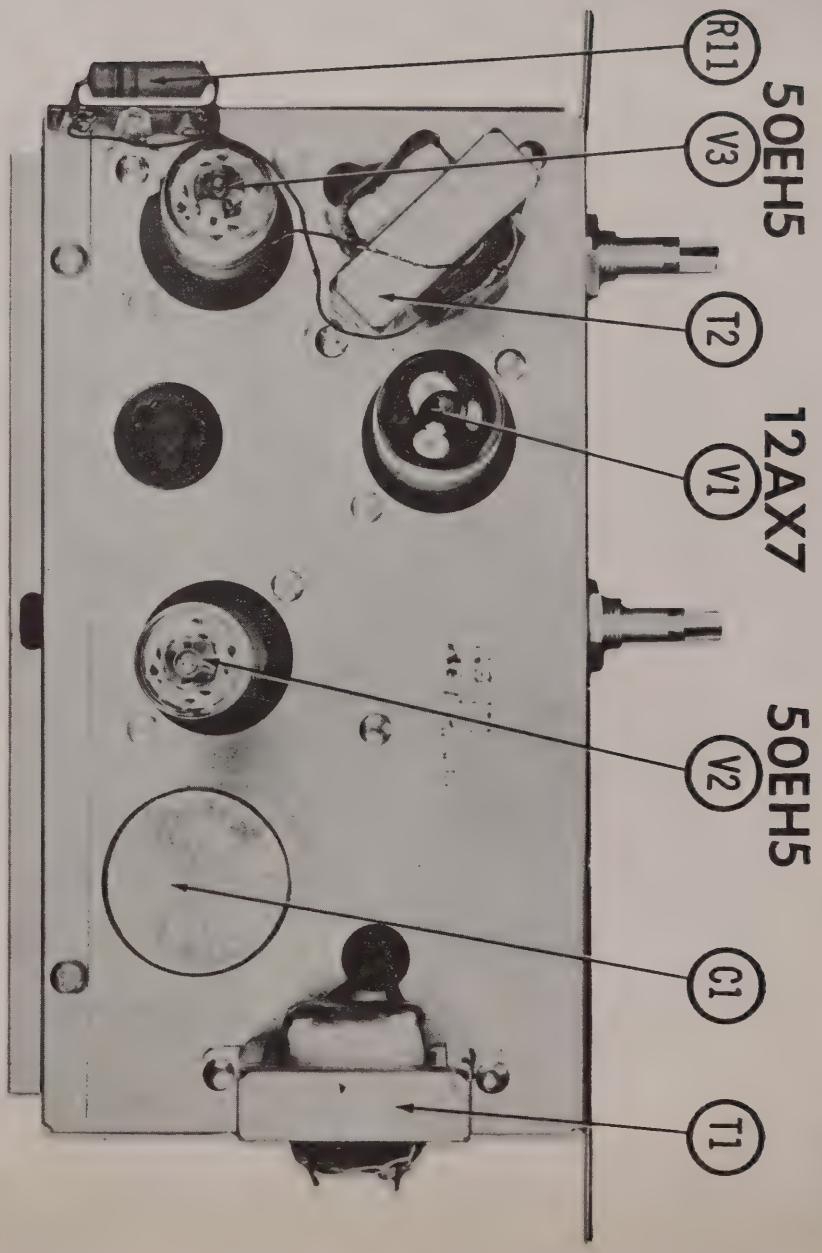
ITEM No.	RATING		RCA Victor PART No.	NOTES
	OHMS	WATT		
R3	10meg			
R4	270K			
R5	470K			
R6	68Ω			
R7	10meg			
R8	270K			
R9	470K			

ITEM No.	RATING		RCA Victor PART No.	NOTES
	OHMS	WATT		
R10	68Ω			
R11	100Ω	1		
R12	4700Ω	1		
R13	15Ω	1		
R14	15Ω	1		
R15	33Ω	1		

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2300Ω	1-2Ω		24S48	A-3026			24S48	S-6X	
T2	2300Ω	1-2Ω		24S48	A-3026			24S48	S-6X	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	RCA Victor PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	79696-A	4A1	
SP2	4"	PM	3-4Ω	79696-A	4A1	
SP3	4"	PM	3-4Ω	79696-A	4A1	
SP4	4"	PM	3-4Ω	79696-A	4A1	

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	RCA Victor PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.050A	106967 ①	1234AH ②	SD-94 ①	M150 ①		① Silicon Type. ② Selenium Type.

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	RCA Victor PART No.	ASTATIC PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M2	106771	13-TB *				* Includes needles and mounting mechanism

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	RCA Victor PART No.	JENSEN PART No.	WALCO PART No.	
M3		†M76 and †M76X or ♦M76D and ♦M76XD		† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M4	Switch	76301	Power Off-On

CABINETS & CABINET PARTS

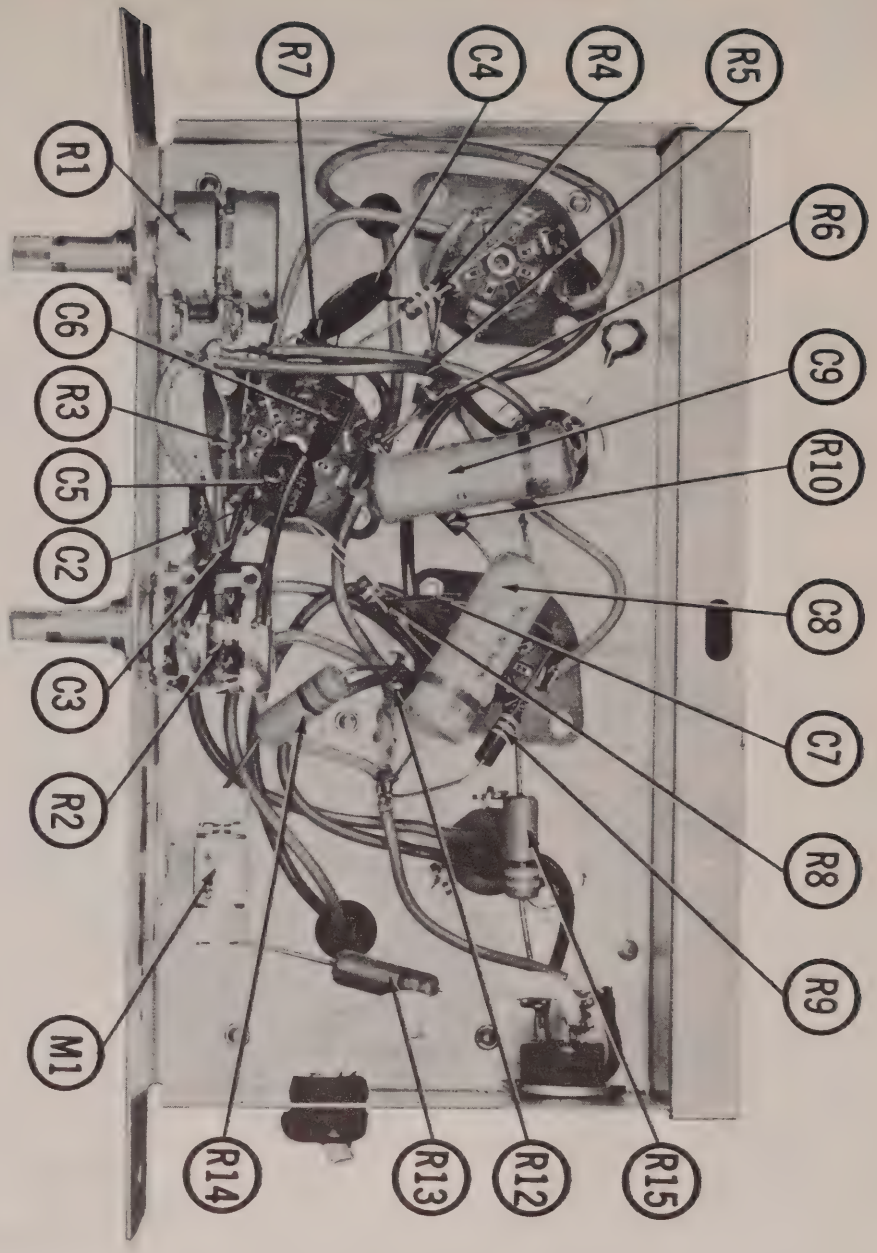
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

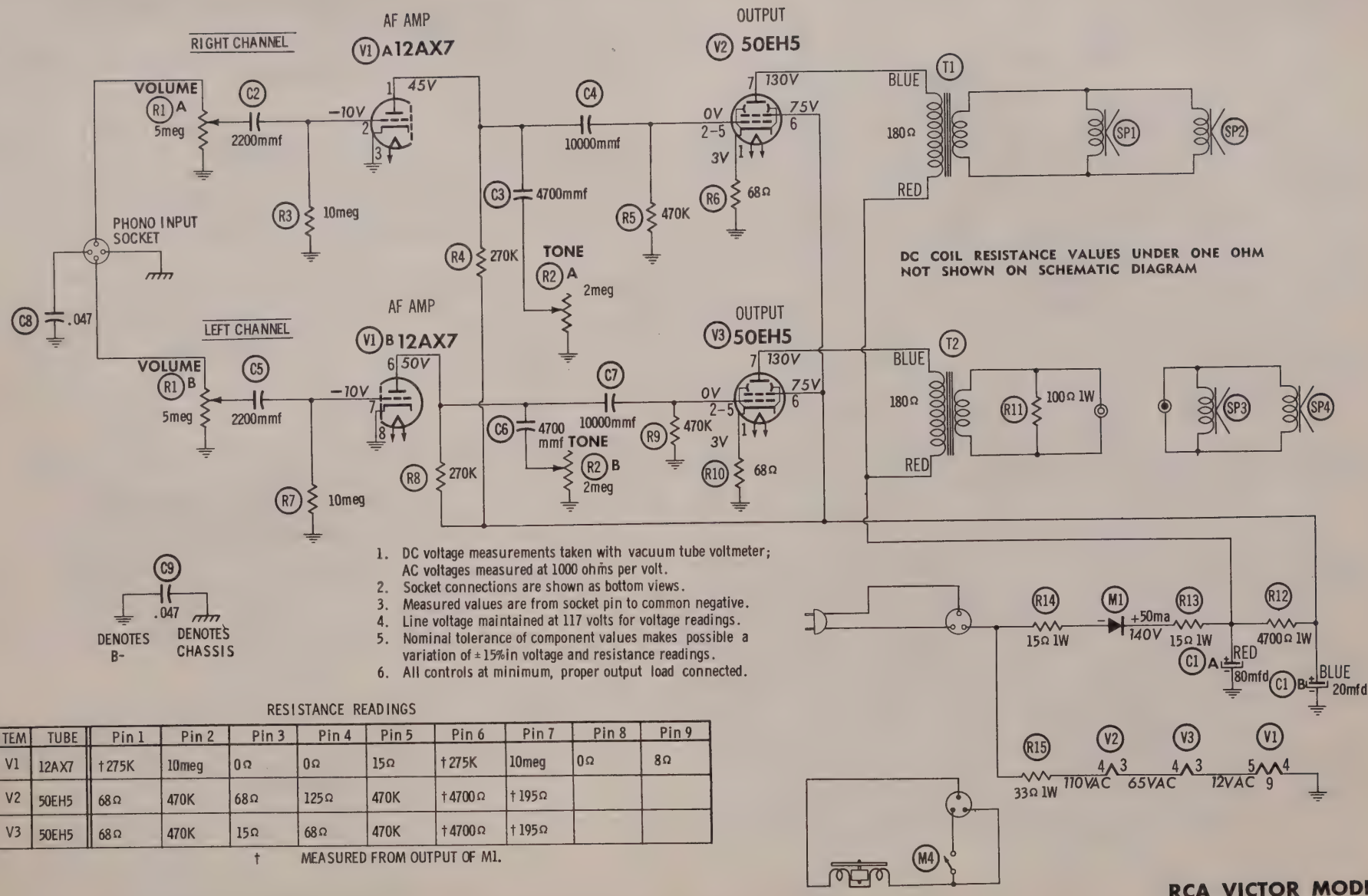
NAME	PART NO.	DESCRIPTION
Knob	106970	Volume, Tone
Cabinet	X4514	Less Front Grille Assembly
Grill Assembly	X5055	
Handle	106971	

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS—BOTTOM VIEW





1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†275K	10meg	0Ω	0Ω	15Ω	†275K	10meg	0Ω	8Ω
V2	50EH5	68Ω	470K	68Ω	125Ω	470K	†4700Ω	†195Ω		
V3	50EH5	68Ω	470K	15Ω	68Ω	470K	†4700Ω	†195Ω		

† MEASURED FROM OUTPUT OF M1.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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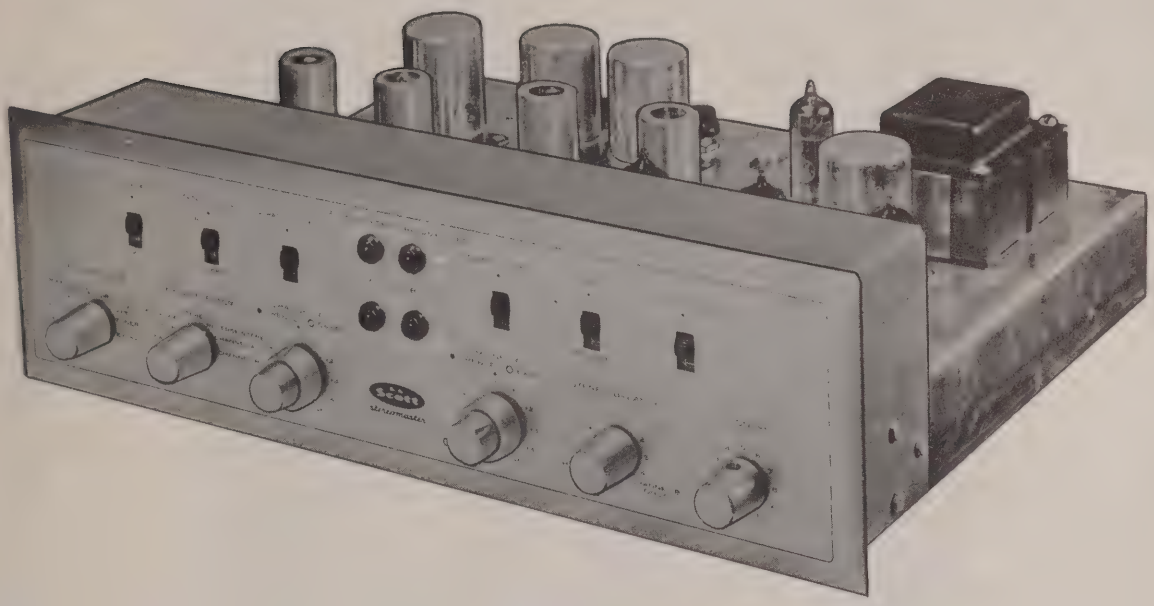
RCA VICTOR MODEL SES6 (Ch. RS-175)

PHOTOFACT* Folder

H. H. SCOTT
MODEL 130

H. H. SCOTT
MODEL 130



H. H. SCOTT
MODEL 130

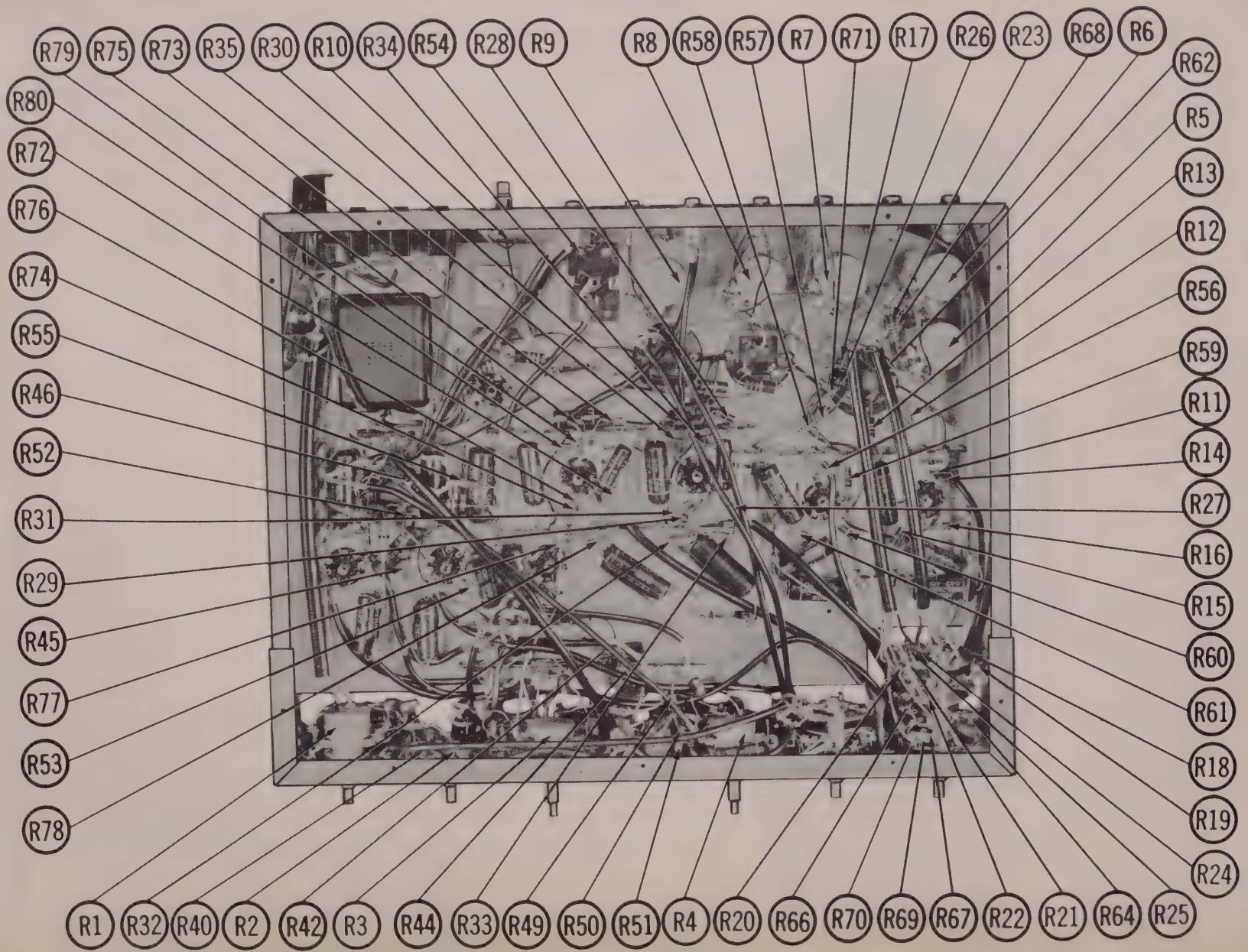
TRADE NAME	H. H. Scott Model 130		
MANUFACTURER	Hermon Hosmer Scott, Inc., 111 Powdermill Road, Maynard, Mass.		
TYPE SET	AC Operated 8 Tube Stereo Preamplifier		
POWER SUPPLY	105-125 Volts AC, 50-60 Cycles	RATING	36 Watts, .31 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

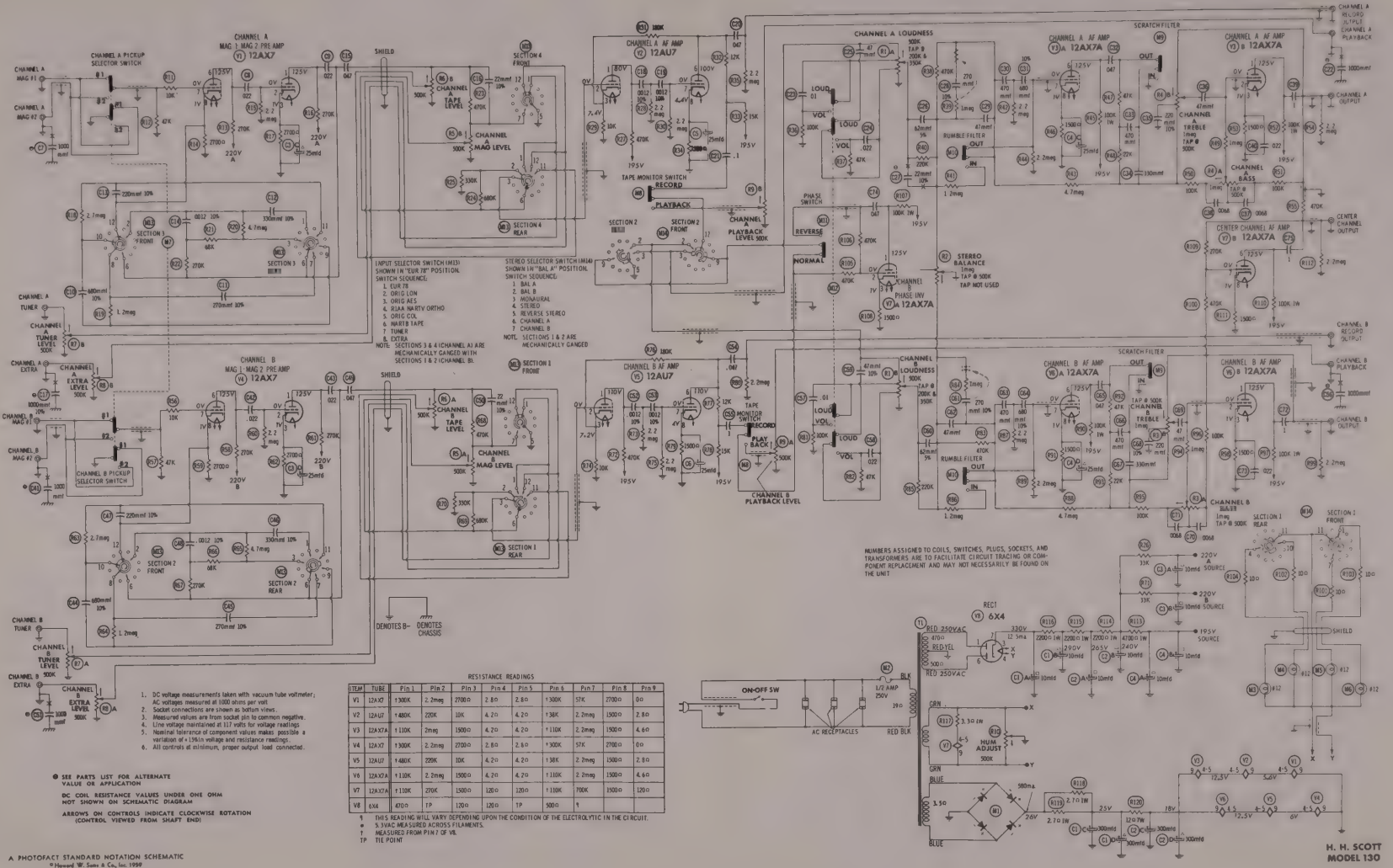
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

J23

SET 450 FOLDER 14



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†300K	2.2meg	2700Ω	2.8Ω	2.8Ω	†300K	57K	2700Ω	0Ω
V2	12AU7	†480K	220K	10K	4.2Ω	4.2Ω	†38K	2.2meg	1500Ω	2.8Ω
V3	12AX7A	†110K	2meg	1500Ω	4.2Ω	4.2Ω	†110K	2.2meg	1500Ω	4.6Ω
V4	12AX7	†300K	2.2meg	2700Ω	2.8Ω	2.8Ω	†300K	57K	2700Ω	0Ω
V5	12AU7	†480K	220K	10K	4.2Ω	4.2Ω	†38K	2.2meg	1500Ω	2.8Ω
V6	12AX7A	†110K	2.2meg	1500Ω	4.2Ω	4.2Ω	†110K	2.2meg	1500Ω	4.6Ω
V7	12AX7A	†110K	270K	1500Ω	120Ω	120Ω	†110K	700K	1500Ω	120Ω
V8	6X4	470Ω	TP	120Ω	120Ω	TP	500Ω	¶		

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
⊕ 5.3VAC MEASURED ACROSS FILAMENTS.
† MEASURED FROM PIN 7 OF V8.
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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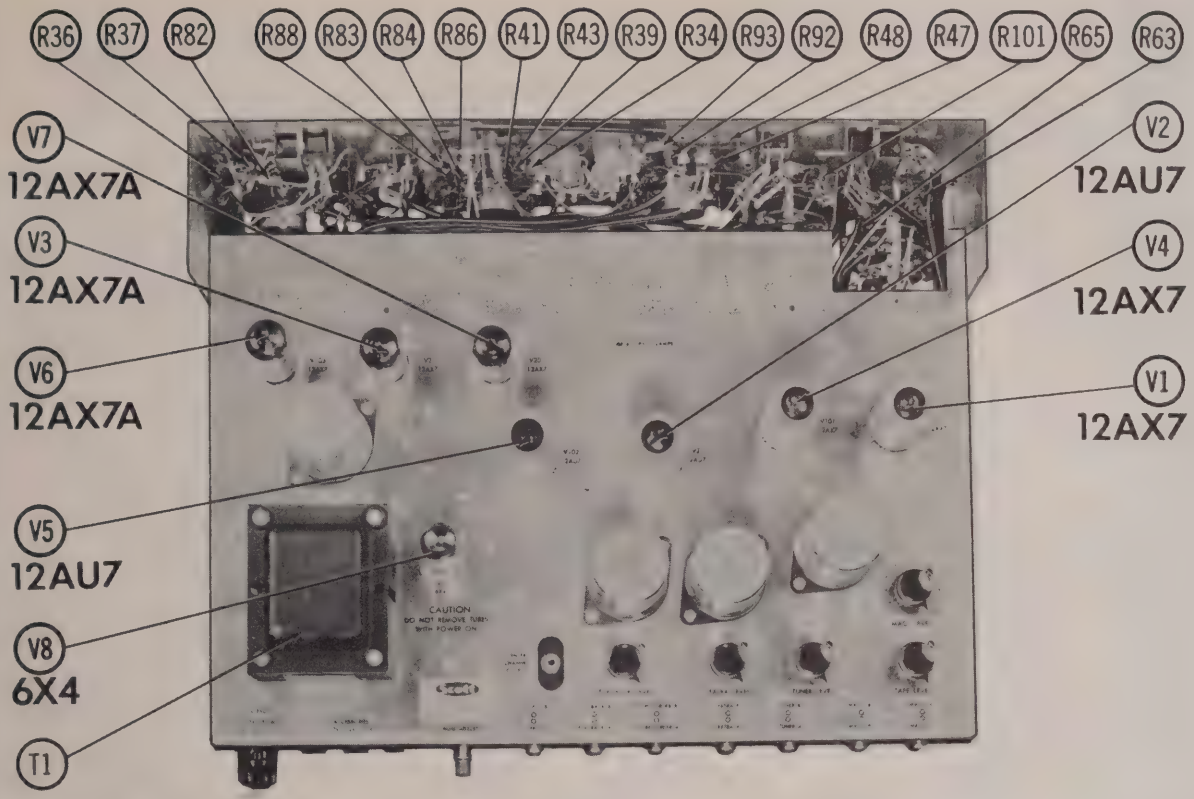
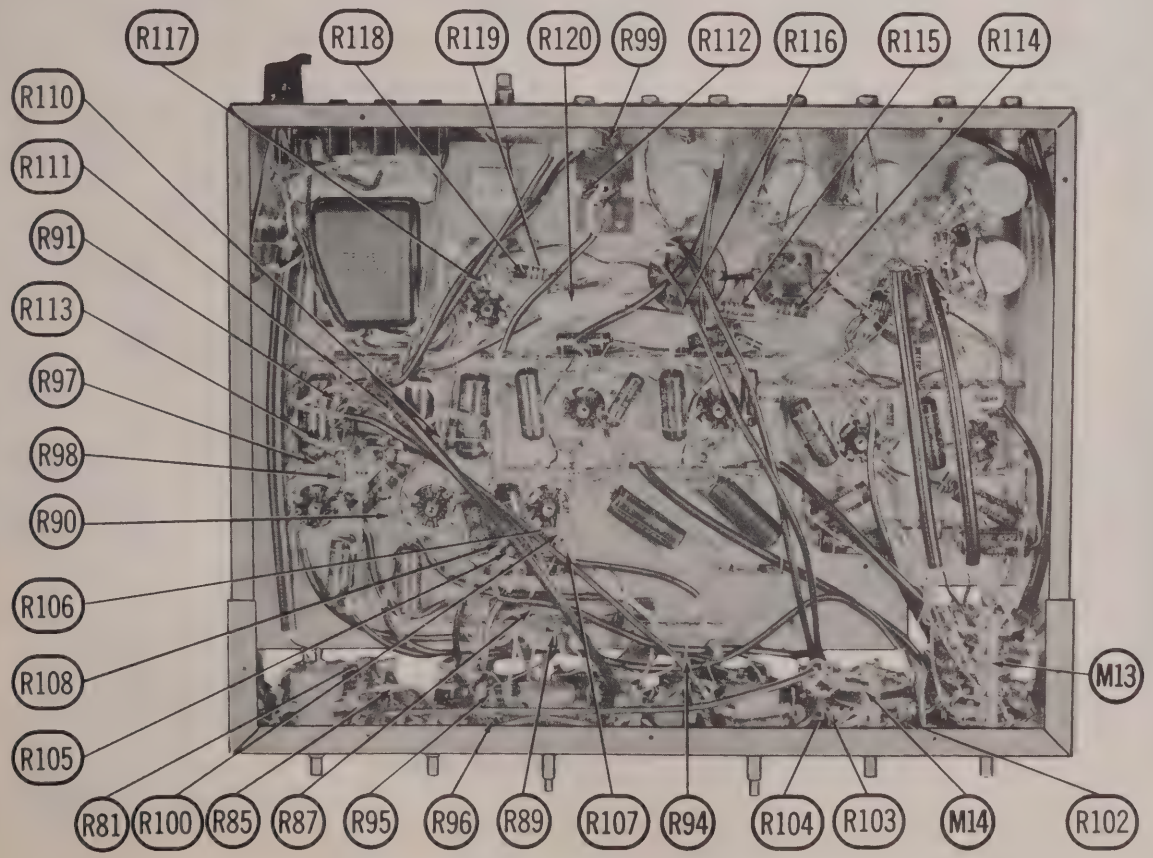
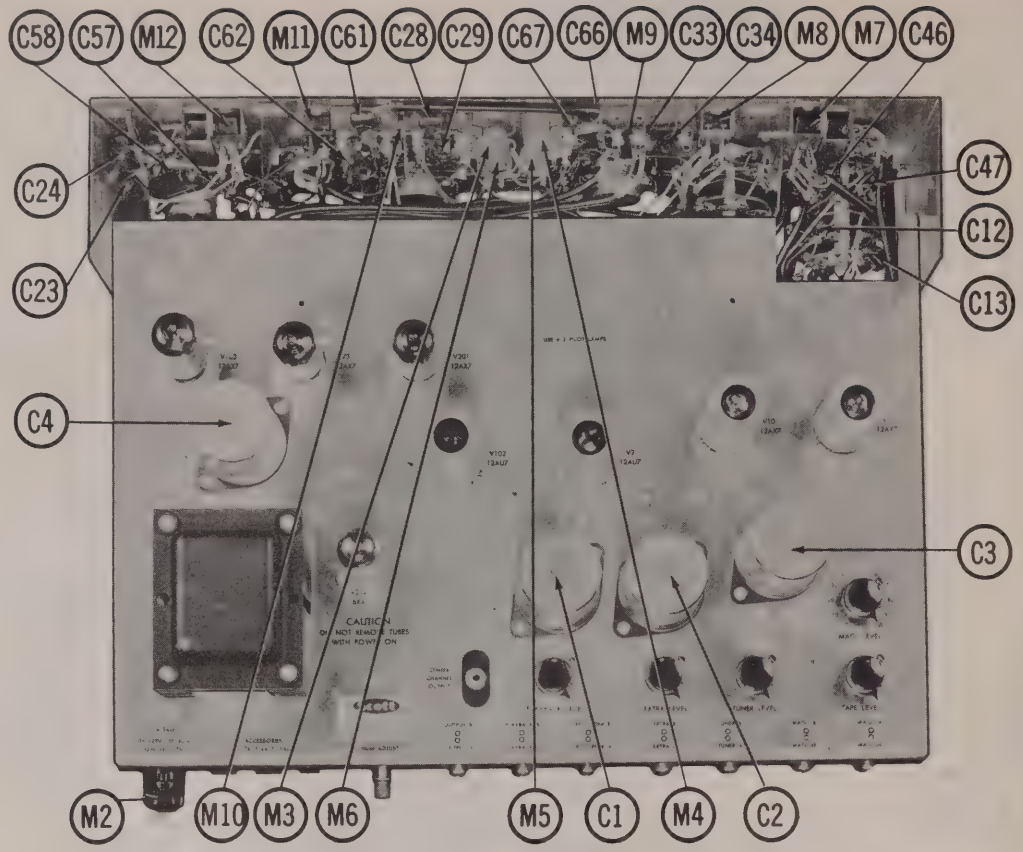
H. H. SCOTT MODEL 130



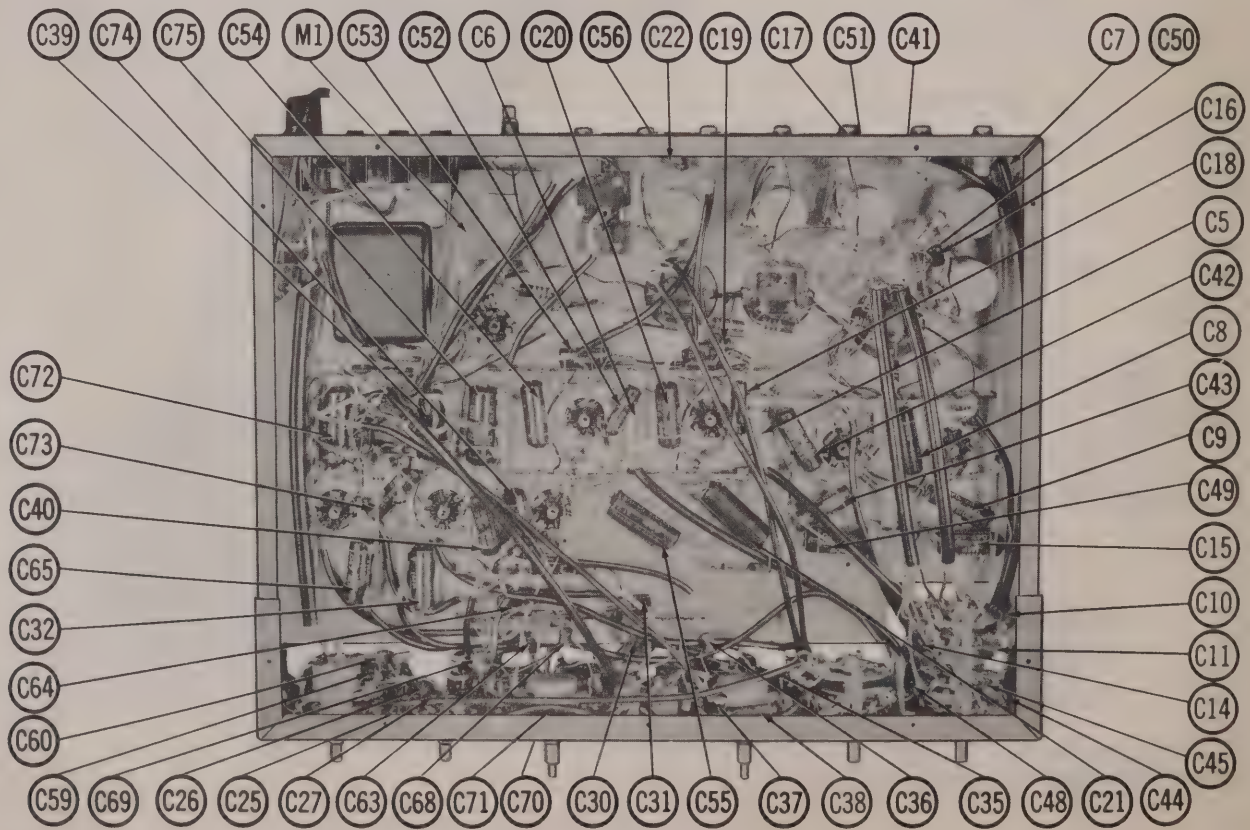
CHASSIS TOP VIEW - RESISTOR & TUBE IDENT.



CHASSIS BOTTOM VIEW - RESISTOR IDENT.



CHASSIS TOP VIEW - CAPACITOR & MISC. IDENT.



CHASSIS BOTTOM VIEW - CAPACITOR & MISC. IDENT.

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Channel A Mag 1-2 Preamp.	12AX7	
V2	Channel A AF Amplifier	12AU7	
V3	Channel A AF Amplifier	12AX7A	
V4	Channel B Mag 1-2 Preamp.	12AX7	
V5	Channel B AF Amplifier	12AU7	
V6	Channel B AF Amplifier	12AX7A	
V7	Phase Inv. - Center Ch. AF Amplifier	12AX7A	
V8	Rectifier	6X4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	H. H. Scott PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■10	350	CEC-2X300-2X10					TVLS-4605.9*	
B	▬10	350							
C	300	25							
D	▲300	25							
C2A	■10	350	CEC-2X300-2X10					TVLS-4605.9*	
B	▬10	350							
C	300	25							
D	▲300	25							
C3A	▬10	450	CEC-2X10-2X25	AFH4-63	D0880	FP474.5	TMQ-72	TVL-4711.6	
B	■10	450							
C	▲25	25							
D	25	25							
C4A	▬10	450	CEC-2X10-2X25	AFH4-63	D0880	FP474.5	TMQ-72	TVL-4711.6	
B	■10	450							
C	25	25							
D	▲25	25							
C5	25	25	CET25/25	PRS25V25	BBR25-25	TT25X25	TD-25-25	TVA-1205	
C6	25	25	CET25/25	PRS25V25	BBR25-25	TT25X25	TD-25-25	TVA-1205	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	H. H. Scott PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C7	1000				BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	①
C8	.022	400			P488N-022	DD-203	CUB4S22	GEM-4122	4TM-S22	
C9	.022	400			P488N-022	DD-203	CUB4S22	GEM-4122	4TM-S22	
C10	680		10%		1469-00068	D6-681	1R5T68		MS-368	
C11	270		10%		1469-00027	D6-271	5R5T27		MS-327	
C12	330		10%		1469-00033	D6-331	5R5T33		MS-333	
C13	220		10%		1469-00022	D6-221	22R5T22		MS-322	
C14	.0012	400	10%						5BF-D12	
C15	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C16	22		10%		1469-000022	DD-220	22R5Q22		MS-422	
C17	1000				BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	①
C18	.0012	400	10%						5BF-D12	
C19	.0012	400	10%						5BF-D12	
C20	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C21	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C22	1000				BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	①
C23	.01	400			P488N-01	DD-103	CUB4S1	GEM-411	4TM-S1	
C24	.022	400			P488N-022	DD-203	CUB4S22	GEM-4122	4TM-S22	
C25	47				1469-000047	DD-470	22R5Q47		MS-447	
C26	62		5%		1469-000062	TCZ-62	22R5Q62		MS-462	
C27	22		10%		1469-000022	DD-220	22R5Q22		MS-422	①
C28	270		10%		1469-00027	D6-271	5R5T27		MS-327	
C29	47		10%		1469-000047	DD-470	22R5Q47		MS-447	
C30	470		10%		1469-00047	DD-471	5R5T47		MS-370	
C31	680		10%		1469-00068	D6-681	1R5T68		MS-368	
C32	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C33	470		10%		1469-00047	D6-471	5R5T47		MS-347	
C34	330		10%		1469-00033	DD-331	5R5T33		MS-333	
C35	220		10%		1469-00022	D6-221	22R5T22		MS-322	
C36	47		10%		1469-000047	DD-470	22R5Q47		MS-447	

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	H. H. Scott PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C37	.0068	400			P488N-0068	DD-682	CUB6D68	GEM-6288	6TM-D68	
C38	.0068	400			P488N-0068	DD-682	CUB6D68	GEM-6288	6TM-D68	
C39	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C40	.022	400			P488N-022	DD-203	CUB4S22	GEM-4122	4TM-S22	
C41	1000				BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	①
C42	.022	400			P488N-022	DD-203	CUB4S22	GEM-4122	4TM-S22	
C43	.022	400			P488N-022	DD-203	CUB4S22	GEM-4122	4TM-S22	
C44	680		10%		1469-00068	D6-681	1R5T68		MS-368	
C45	270		10%		1469-00027	D6-271	5R5T27		MS-327	
C46	330		10%		1469-00033	D6-331	5R5T33		MS-333	
C47	220		10%		1469-00022	D6-221	22R5T22		MS-322	
C48	.0012	400	10%						5BF-D12	
C49	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C50	22		10%		1469-000022	DD-220	22R5T22		MS-422	
C51	1000				BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	①
C52	.0012	400	10%						5BF-D12	
C53	.0012	400	10%						5BF-D12	
C54	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C55	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C56	1000				BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	①
C57	.01	400			P488N-01	DD-103	CUB4S1	GEM-411	4TM-S1	
C58	.022	400			P488N-022	DD-203	CUB4S22	GEM-4122	4TM-S22	
C59	47		10%		1469-000047	DD-470	22R5Q47		MS-447	
C60	62		5%		1469-000062	TCZ-62	22R5Q62		MS-462	
C61	270		10%		1469-00027	D6-271	5R5T27		MS-327	
C62	47		10%		1469-000047	DD-470	22R5Q47		MS-447	
C63	470		10%		1469-00047	DD-471	5R5T47		MS-347	
C64	680		10%		1464-00068	D6-681	1R5T68		MS-368	
C65	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C66	470		10%		1469-00047	DD-471	5R5T47		MS-347	
C67	330		10%		1469-00033	DD-331	5R5T33		MS-333	
C68	220		10%		1469-00022	D6-221	22R5T22		MS-322	
C69	47		10%		1469-000047	DD-470	22R5Q47		MS-447	
C70	.0068	400			P488N-0068	DD-682	CUB6D68	GEM-6288	6TM-D68	
C71	.0068	400			P488N-0068	DD-682	CUB6D68	GEM-6288	6TM-D68	
C72	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C73	.022	400			P488N-022	DD-203	CUB4S22	GEM-4122	4TM-S22	
C74	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C75	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	

① Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	H. H. Scott PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	RCVD-500K-TT-3F-SW					Loudness, Chan. A, Tap ② 200K & 350K
B	500K	½						Loudness, Chan. B, Tap ② 200K & 350K
R2A	1meg	½	RCV-1MT-3F	BT-71	A47F5-1meg	Q19-137X	UT443	Stereo Balance, Tap ② 500K
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R3A	1meg	½	RCVC-1MT	F1-56			†	Bass, Chan. B, Tap ② 500K
B	1meg	½		R2-56				Treble, Chan. B, Tap ② 500K
R4A	1meg	½	RCVC-1MT	F1-56			†	Bass, Chan. A, Tap ② 500K
B	1meg	½		R2-56				Treble, Chan. A, Tap ② 500K
R5A	500K	½	RCVD-500K-3	B-59		Q11-133	* UE1295	Mag Level, Channel B
B	500K	½		SR-59		M11-133		Mag Level, Channel A
R6A	500K	½	RCVD-500K-3	B-59		Q11-133	* UE1295	Tape Level, Channel B
B	500K	½		SR-59		M11-133		Tape Level, Channel A
R7A	500K	½	RCVD-500K-3	B-59		Q11-133	* UE1295	Tuner Level, Channel B
B	500K	½		SR-59		M11-133		Tuner Level, Channel A
R8A	500K	½	RCVD-500K-3	B-59		Q11-133	* UE1295	Extra Level, Channel B
B	500K	½		SR-59		M11-133		Extra Level, Channel A
R9A	500K	½	RCVD-500K-3	B-59		Q11-133	* UE1295	Playback Level, Channel B
B	500K	½		SR-59		M11-133		Playback Level, Channel A
R10A	500K	½	RCV-500-P	AB-4	A47-500-S	Q11-103	U2	Hum Adjust
B	Shaft			AK-1	FKS-1/4	R.Q.	Not Req.	

† "STA-LOC" Equivalent: FB16T55, RU16T55, CS3500. * "STA-LOC" Equivalent: FA55L, RU55L, CS3500.

PARTS LIST AND DESCRIPTIONS (cont)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	H. H. Scott PART No.	NOTES
R11	10K			
R12	47K			
R13	270K			
R14	2700Ω			
R15	2.2meg			
R16	270K			
R17	2700Ω			
R18	2.7meg			
R19	1.2meg			
R20	4.7meg			
R21	68K			
R22	270K			
R23	470K			
R24	680K			
R25	330K			
R26	33K			
R27	470K			
R28	2.2meg			
R29	10K			
R30	2.2meg			
R31	180K			
R32	12K			
R33	15K			
R34	1500Ω			
R35	2.2meg			
R36	100K			
R37	47K			
R38	470K			
R39	1meg			
R40	220K			
R41	1.2meg			
R42	2.2meg			
R43	4.7meg			
R44	2.2meg			
R45	100K	1		
R46	1500Ω			
R47	47K			
R48	22K			
R49	1meg			
R50	100K			
R51	100K			
R52	100K	1		
R53	1500Ω			
R54	2.2meg			
R55	470K			
R56	10K			
R57	47K			
R58	270K			
R59	2700Ω			
R60	2.2meg			
R61	270K			
R62	2700Ω			
R63	2.7meg			
R64	1.2meg			
R65	4.7meg			

ITEM No.	RATING OHMS	RATING WATT	H. H. Scott PART No.	NOTES
R66	68K			
R67	270K			
R68	470K			
R69	680K			
R70	330K			
R71	33K			
R72	470K			
R73	2.2meg			
R74	10K			
R75	2.2meg			
R76	180K			
R77	12K			
R78	15K			
R79	1500Ω			
R80	2.2meg			
R81	100K			
R82	47K			
R83	470K			
R84	1meg			
R85	220K			
R86	1.2meg			
R87	2.2meg			
R88	4.7meg			
R89	2.2meg			
R90	100K	1		
R91	1500Ω			
R92	47K			
R93	22K			
R94	1meg			
R95	100K			
R96	100K			
R97	100K	1		
R98	1500Ω			
R99	2.2meg			
R100	470K			
R101	10Ω			
R102	10Ω			
R103	10Ω			
R104	10Ω			
R105	470K			
R106	470K			
R107	100K	1		
R108	1500Ω			
R109	270K			
R110	100K	1		
R111	1500Ω			
R112	2.2meg			
R113	4700Ω	1		
R114	2200Ω	1		
R115	2200Ω	1		
R116	2200Ω	1		
R117	3.3Ω	1		
R118	2.7Ω	1		
R119	2.7Ω	1		
R120	12Ω	7		

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA H. H. Scott PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .31A	500VCT @ .012A	25V @ .580A	TR-5-2						
	SEC. 3	SEC. 4	SEC. 5							
	6.3V @ 1.3A									

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA H. H. Scott PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.580A		1017	C1B	604B	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA H. H. Scott PART No. FUSE	H. H. Scott PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M2	3AG	½A 250V			312.500 (3AG ½A 250V)	342012	AGC½	HKP-CC

MISCELLANEOUS

ITEM No.	PART NAME	H. H. Scott PART No.	NOTES
M3	Lamp		#12
M4	Lamp		#12
M5	Lamp		#12
M6	Lamp		#12
M7	Switch		Pickup A-B (Ganged DPDT, Slide Type)
M8	Switch		Tape Monitor Record-Playback (DPDT, Slide Type)
M9	Switch		Scratch Filter In-Out (DPDT, Slide Type)
M10	Switch		Rumble Filter In-Out (DPDT, Slide Type)
M11	Switch		Phase Normal-Reverse (DPDT, Slide Type)
M12	Switch		Loudness-Volume (Ganged DPDT, Slide Type)
M13	Switch		Input Selector (8 Position, Rotary Wafer Type)
M14	Switch		Stereo Selector (7 Position, Rotary Wafer Type)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

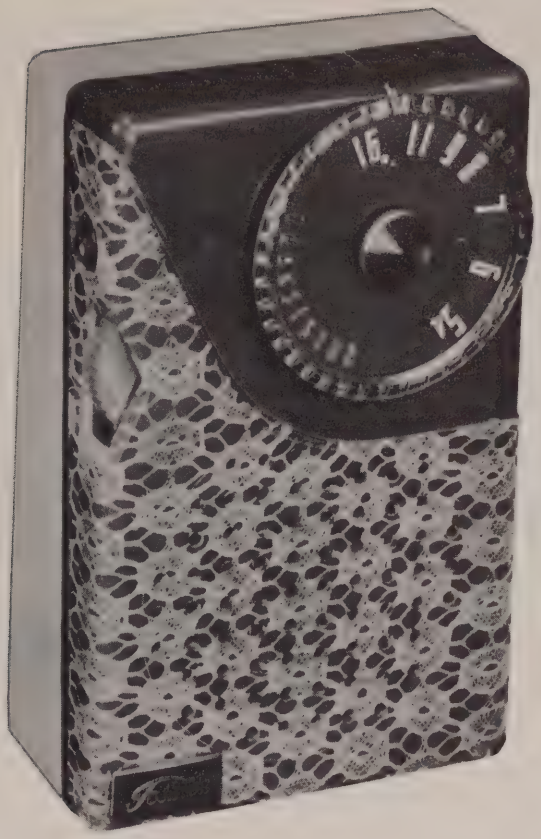
STEREO BALANCE ADJUSTMENT

Alternately switch Selector from "Bal. A" to "Bal. B". Adjust Stereo Balance control (R2) and Tone controls for equal sound output. The Center Channel should be inoperative during adjustment.

PHOTOFACT* Folder with CIRCUITRACE*

TOSHIBA MODEL 5TR-193, 5TR-194

TOSHIBA MODEL 5TR-193, 5TR-194



TOSHIBA MODEL 5TR-193, 5TR-194

TRADE NAME	Toshiba Model 5TR-193, 5TR-194
IMPORTER	Excel Corp. of America, 9 Rockefeller Plaza, New York 20, N. Y.
TYPE SET	Battery Operated Portable Transistorized AM Receiver
POWER SUPPLY	9 Volts DC
TUNING RANGE—BROADCAST	530 - 1700KC
RATING	9MA @ 9 Volts DC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A4, A6..... GENERAL CEMENT #9087, 9089
WALSCO #2528

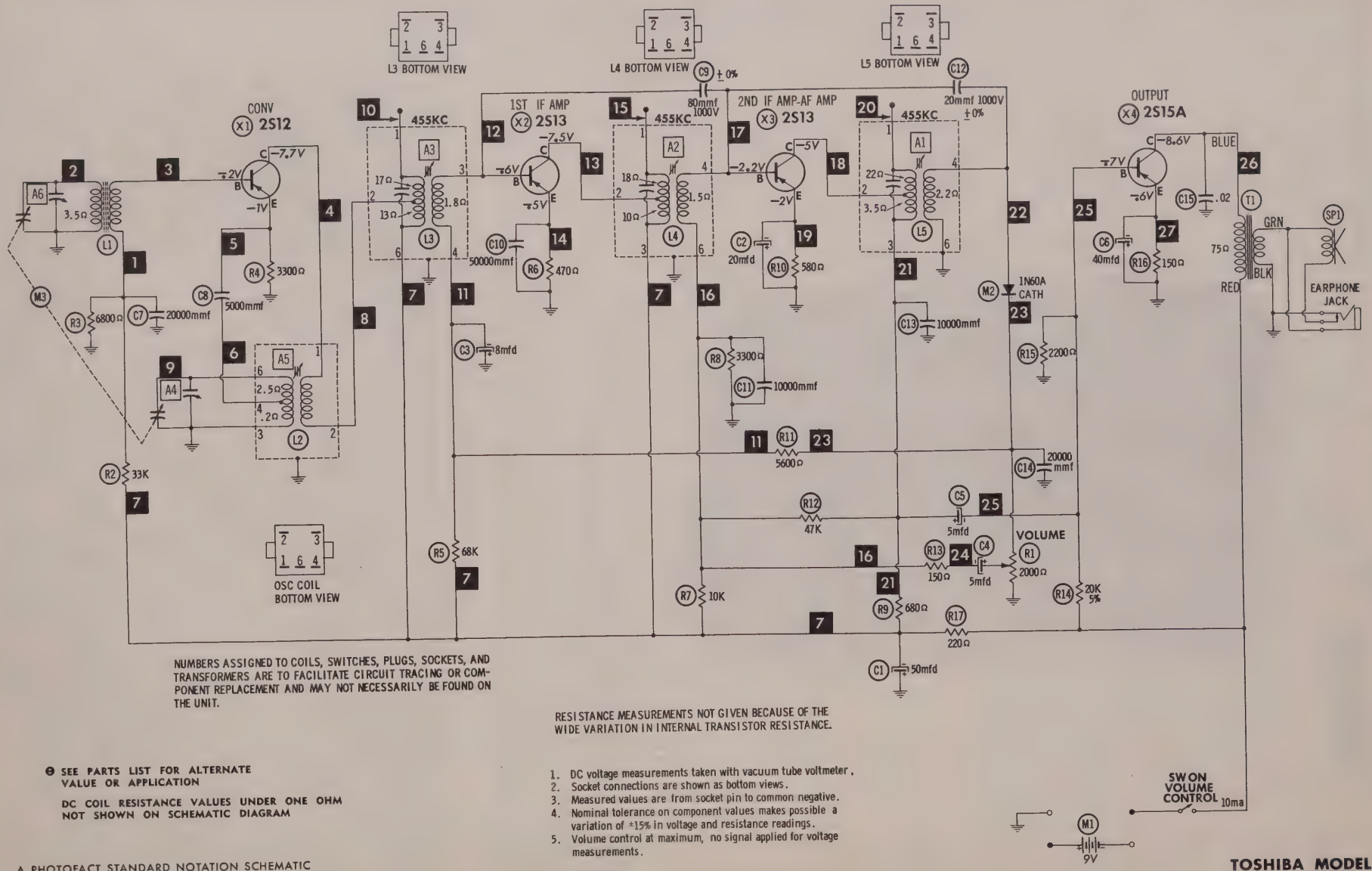
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1700KC	"	"	A4	"
3.		"	600KC	Tune to 600KC signal	"	A5	"
4.		"	1400KC	Tune to 1400KC signal	"	A6	"

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

J136

SET 450 FOLDER 15



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

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TOSHIBA MODEL 5TR-193, 5TR-194

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2S12	Converter		2N140	2N486	2N140	PNP
X2	2S13	1st IF Amplifier		2N139	2N482	2N139	PNP
X3	2S13	2nd IF Amp. - AF Amp.		2N139	2N482	2N139	PNP
X4	2S15A	Output		2N109		2N109	PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	TOSHIBA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	50	10	30235	XPP-10050	NLW50-10	TT10X50	ML50-15	TE-1119	
C2	20	3	30366	XPP-3020	NLW20-6	TT3X25	ML25-3	TE-1054	
C3	8	3	30226	XPP-3008	NLW8-6	TT6X8	ML8-6	TE-1052.5	
C4	5	6	30365	XPP-6005	NLW5-6	TT6X5	ML5-6	TE-1084	
C5	5	6	30365	XPP-6005	NLW5-6	TT6X5	ML5-6	TE-1084	
C6	40	3	30236	XPP-3040	NLW40-3	TT3X40	ML40-6	TE-1057	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	TOSHIBA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C7	20000			30212	BPD-02	DD-203	H-05S2	TA-120	TG-S20	
C8	5000			30210	BPD-005	DD-502	H-05D5	TA-250	TG-D50	
C9	80	1000	±0%	30363						
C10	50000			30213	BPD-05	DDA-503	H-05S5	TA-150	TG-S50	
C11	10000			30212	BPD-01	DM-103	H-05S1	TA-110	TG-S10	
C12	20	1000	±0%	30362						
C13	10000			30364	BPD-01	DM-103	H-05S1	TA-110	TG-S10	
C14	20000			30212	BPD-02	DDM-203	H-05S2	TA-120	TG-S20	
C15	.02	250		30284	P485N-02	DDM-203	BYB6S2	B-120	5HK-S2	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	TOSHIBA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	2000Ω	1/4	40256	B16-212				Volume & Switch

RESISTORS

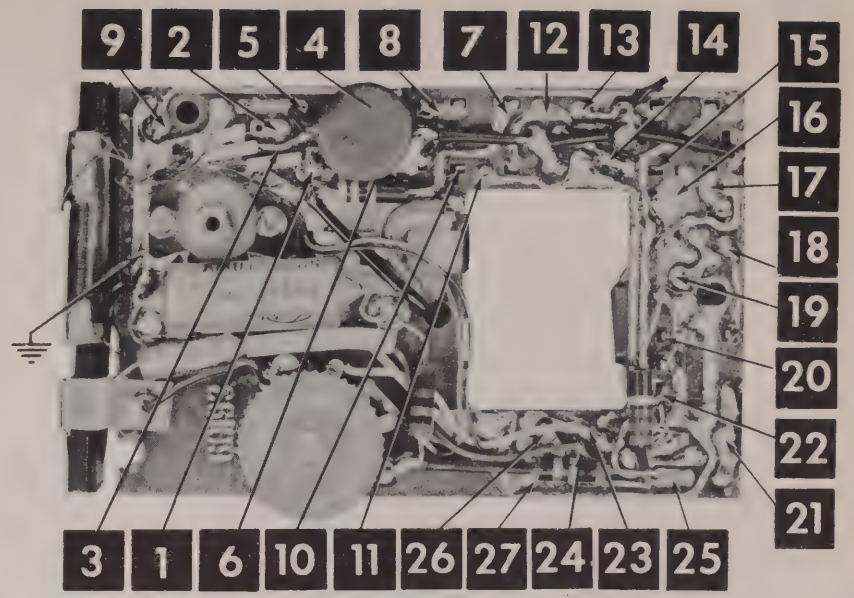
All wattages 1/2 watt, or less, unless otherwise listed.

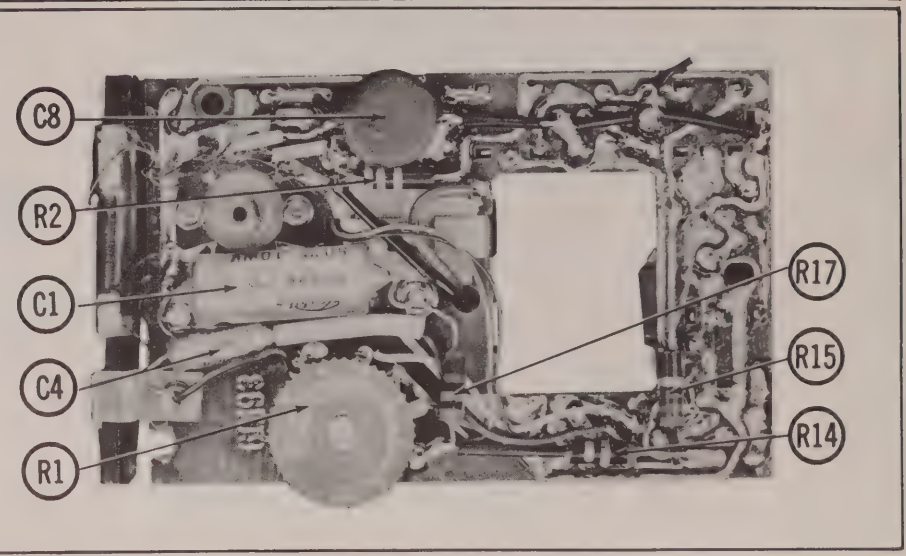
ITEM No.	RATING		TOSHIBA PART No.	NOTES
	OHMS	WATT		
R2	33K		40219	
R3	6800Ω		40234	
R4	3300Ω		40536	
R5	68K		40549	
R6	470Ω		40210	
R7	10K		40540	
R8	3300Ω		40536	
R9	680Ω		40211	

ITEM No.	RATING		TOSHIBA PART No.	NOTES
	OHMS	WATT		
R10	580Ω		40528	
R11	5600Ω		40538	
R12	47K		40220	
R13	150Ω		40207	
R14	20K 5%		40267	
R15	2200Ω		40534	
R16	150Ω		40522	
R17	220Ω		40208	

PRINTED BOARD

A Howard W. Sams CIRCUITRACE® Photo





PRINTED BOARD

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		TOSHIBA PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	20191						
L2	Osc. Coil	20183						
L3	1st IF Trans.	20172						
L4	2nd IF Trans.	20173						
L5	3rd IF Trans.	20174						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	TOSHIBA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2500Ω	8-10Ω	20193				TA-44①		TY-47X①	①Bend tabs down.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	TOSHIBA PART No.	QUAM PART No.	
SP1	2 1/4"	PM	8-10Ω	60079		

BATTERIES

ITEM No.	VOLTAGE	TOSHIBA PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V			2U6		216		M1604	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		TOSHIBA PART No.	CBS PART No.	SYLVANIA PART No.	
M2	1N60A	1N60A	1N60	1N60	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	TOSHIBA PART No.	NOTES
M3	Tuning Cap. Printed Board Earphone	30361 60193 50074-1	Ant. 165mmf, Osc. 70mmf Max.

CABINETS & CABINET PARTS

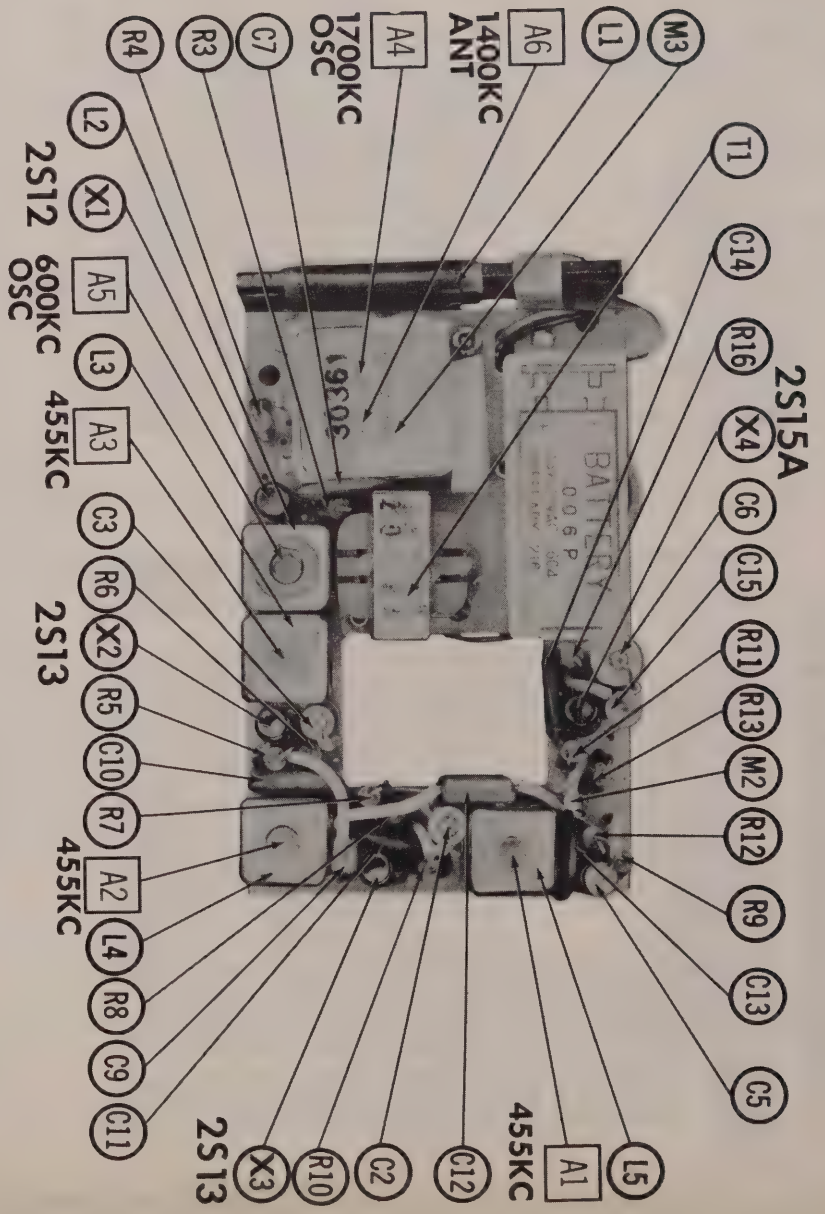
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	91119	Tuning, Model 5TR-193
Knob	91120	Volume-On-Off, Model 5TR-193
Cabinet Assembly	91115	Model 5TR-193

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



PHOTOFACT* Folder

ZENITH MODELS SF174R, SF177E, R (Ch. 3B30, 4B22, 4B23)

ZENITH MODELS SF174R, SF177E, R (Ch. 3B30, 4B22, 4B23)

MODEL SF177E

ZENITH MODELS SF174R, SF177E, R (Ch. 3B30, 4B22, 4B23)

TRADE NAME	Zenith Models SF174R, SF177E, SF177R (Tuner Chassis 4B22, 4B23; Power Chassis 3B30)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois
TYPE SET	AC Operated 7 Tube AM Receiver With 4 Speed Automatic Record Changer
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles
RATING	98 Watts, .92 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	450 - 1620KC

FOR SERVICE INFORMATION ON RECORD CHANGER S-14090 - SEE SIMILAR ZENITH S-14086 - PHOTOFACT SET 402 FOLDER 15

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:
A1 thru A4, A6.....GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545
A5, A7.....GENERAL CEMENT #5000, 5003, 5014, 5015, 5016, 8276, 8290
WALSCO #2512, 2515, 2522, 2523, 2525, 2537

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.5mfd	High side to pin 7 (grid) of 6BE6 (V1). Low side to chassis.	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1600KC	1600KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	600KC	600KC	"	A6	Adjust for maximum output while rocking tuning gang.
4.		"	1400KC	Tune to 1400KC signal	"	A7	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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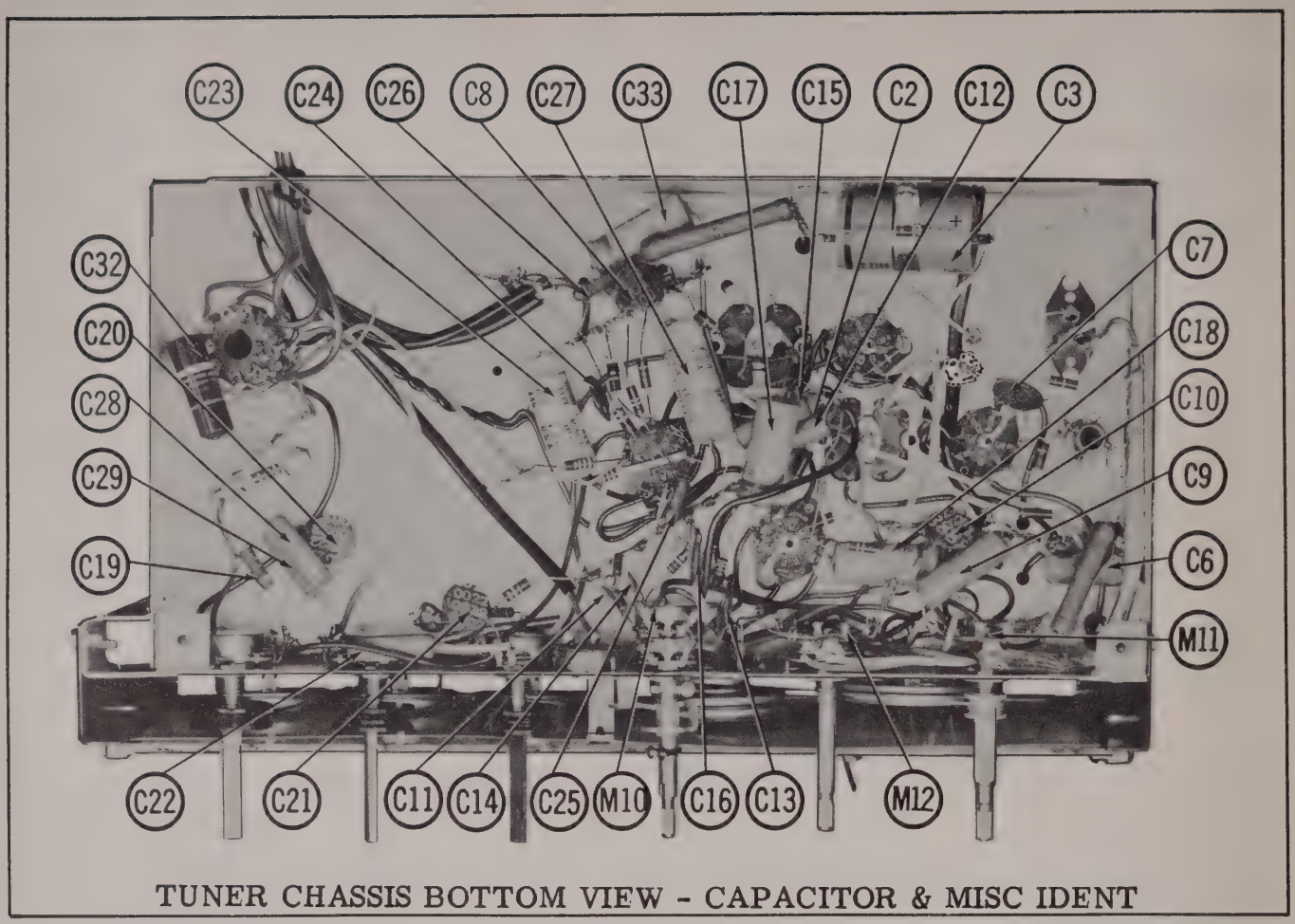
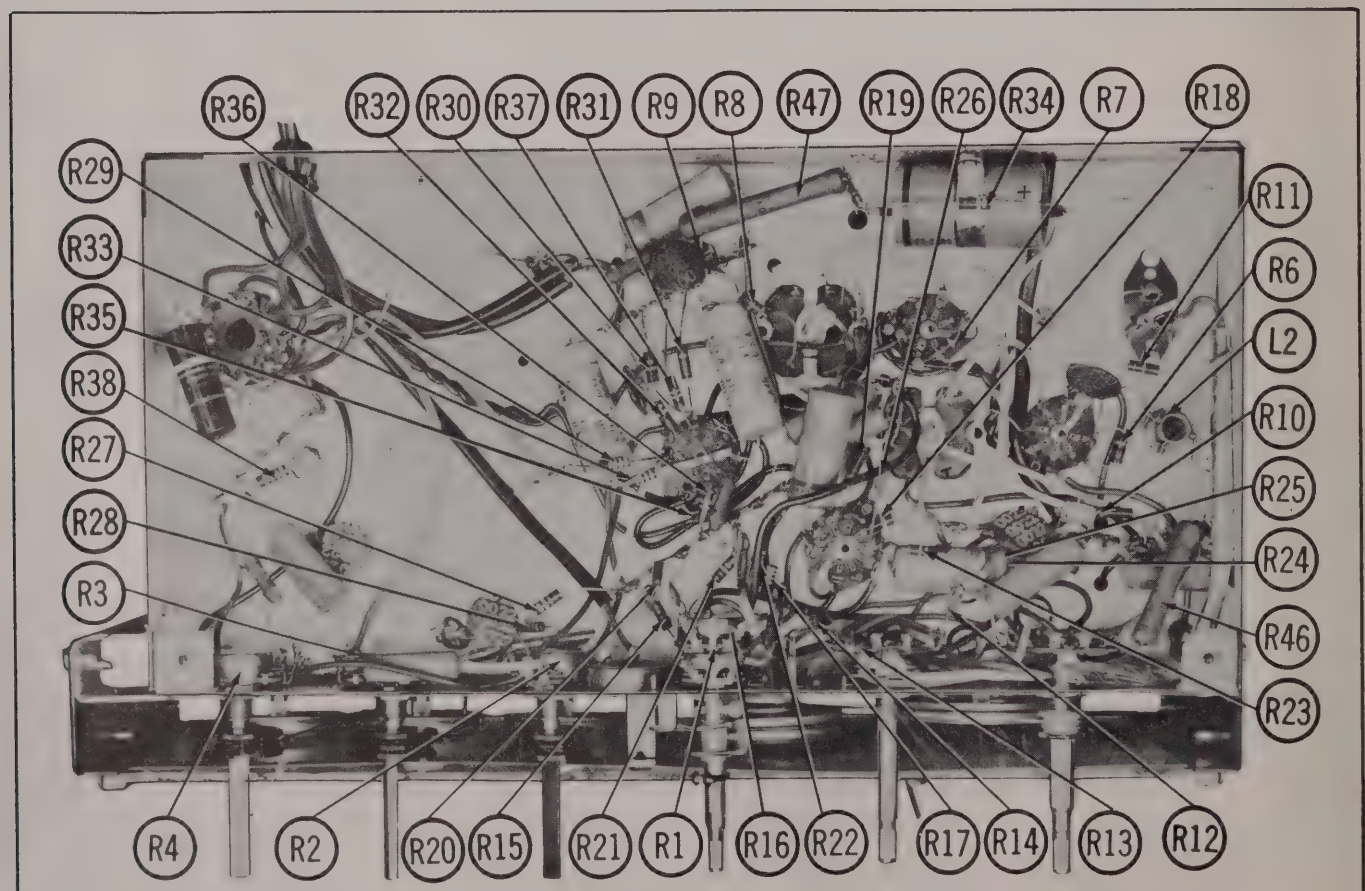
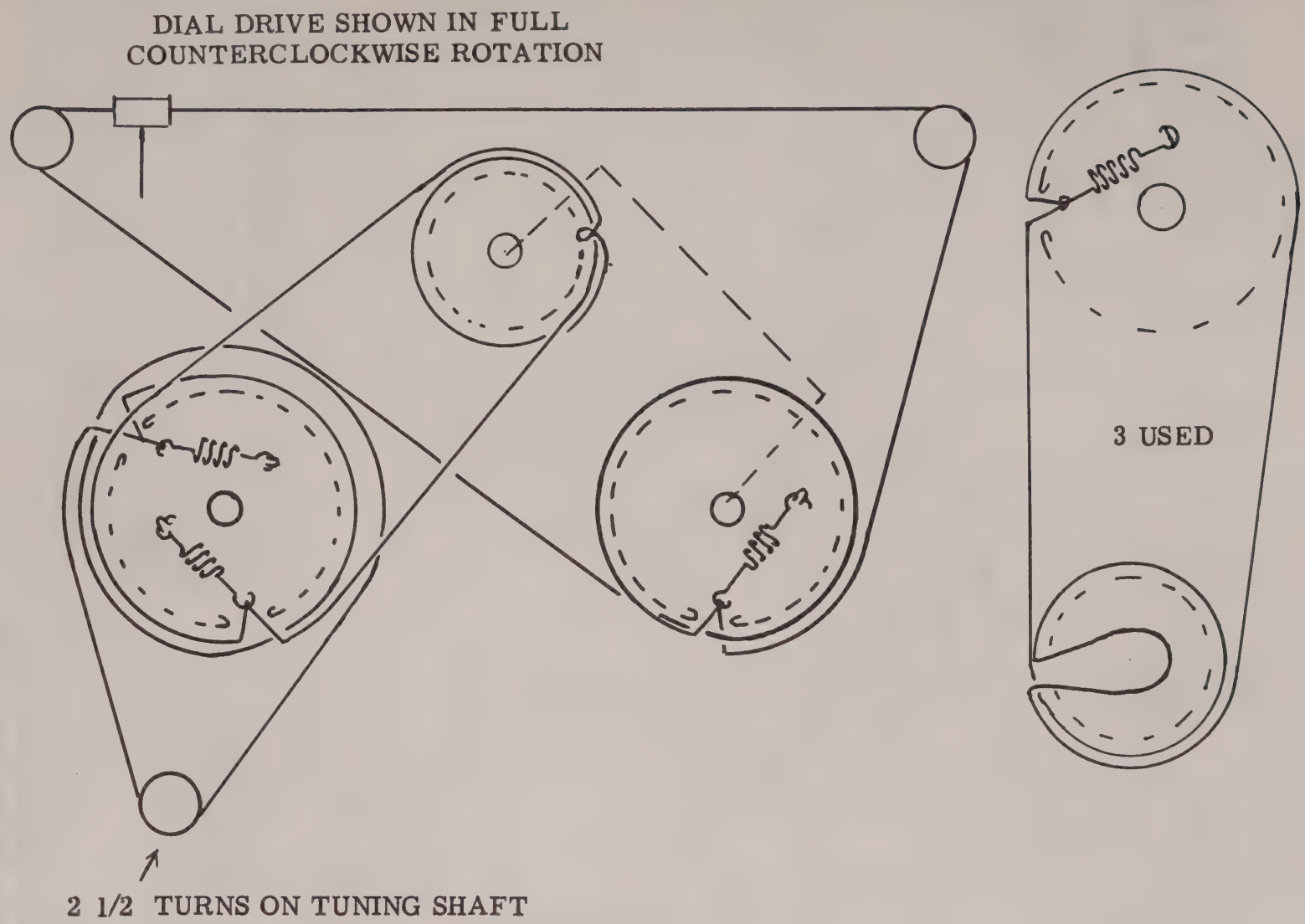


TUNER CHASSIS BOTTOM VIEW - CAPACITOR & MISC IDENT

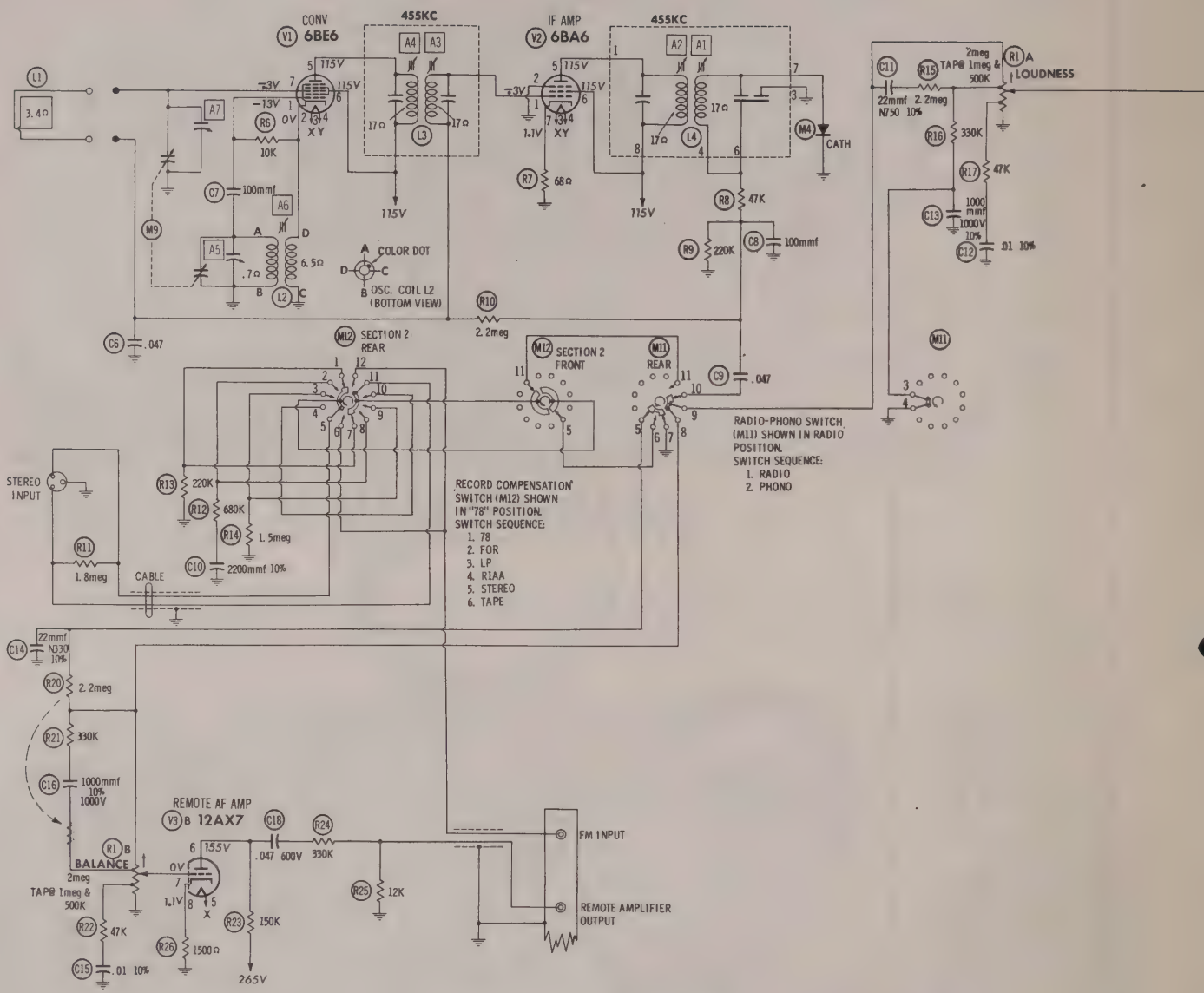


TUNER CHASSIS BOTTOM VIEW - RESISTOR & INDUCTOR IDENT



DRIVE CORD STRINGING

ZENITH
MODEL SF174R



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BE6	10K	.7Ω	.1Ω	.1Ω	†9300Ω	†9300Ω	2.4meg		
V2	6BA6	2.4meg	0Ω	.1Ω	.1Ω	†9300Ω	†9300Ω	68Ω		
V3	12AX7	†110K	0Ω	1000Ω	.1Ω	.1Ω	†160K	0Ω	1500Ω	.1Ω
V4	12AU7	†50K	47K	2200Ω	.1Ω	.1Ω	†50K	110K	2200Ω	.1Ω
V5	EL84 6BQ5	210K	210K	180Ω	.1Ω	.1Ω	NC	†210Ω	NC	†1500Ω
V6	EL84 6BQ5	260K	260K	180Ω	.1Ω	.1Ω	NC	†210Ω	NC	†1500Ω
V7	5U4GB	NC	¶	NC	90Ω	NC	100Ω	NC	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 2 OF V7.
NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

❶ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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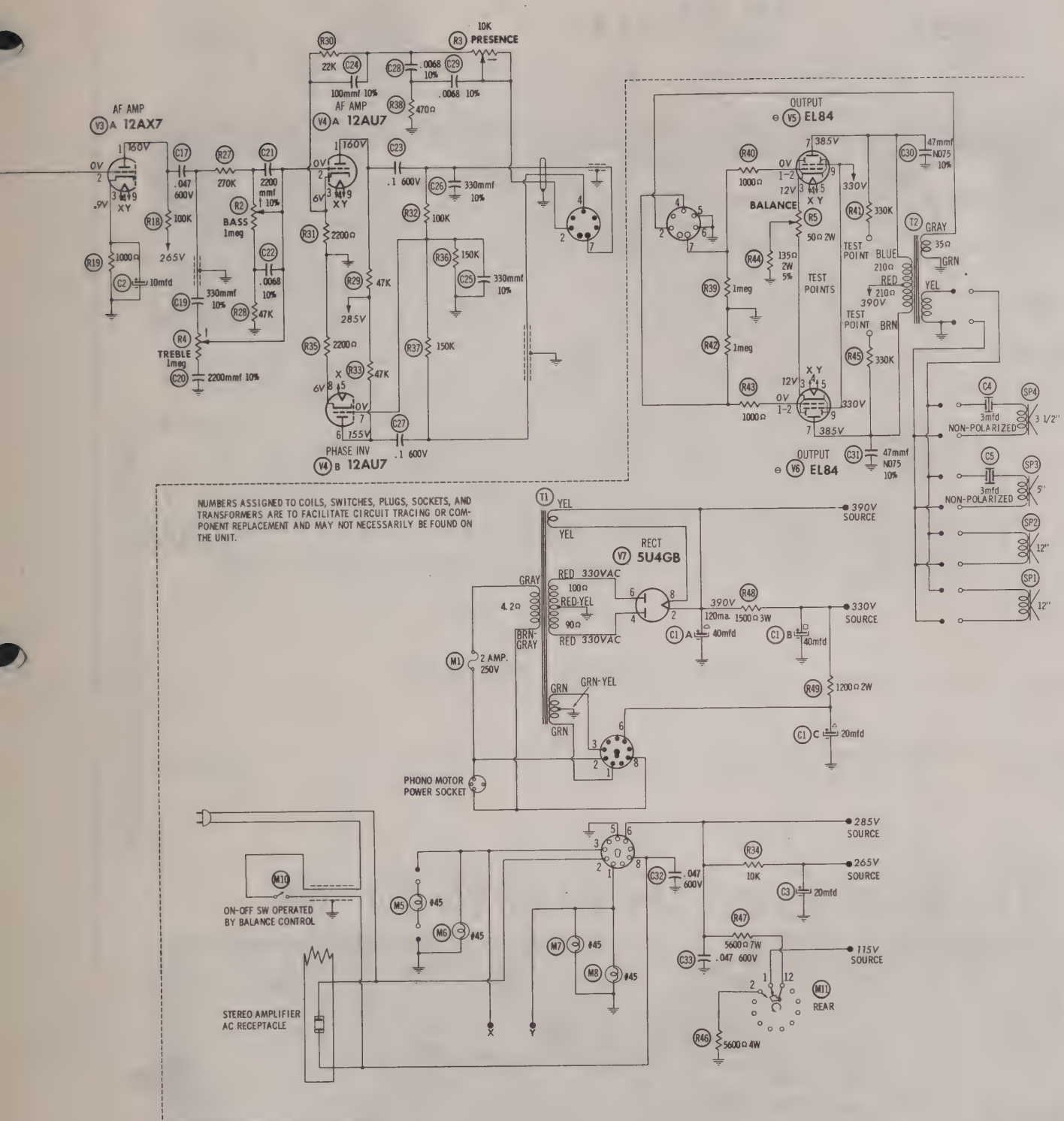
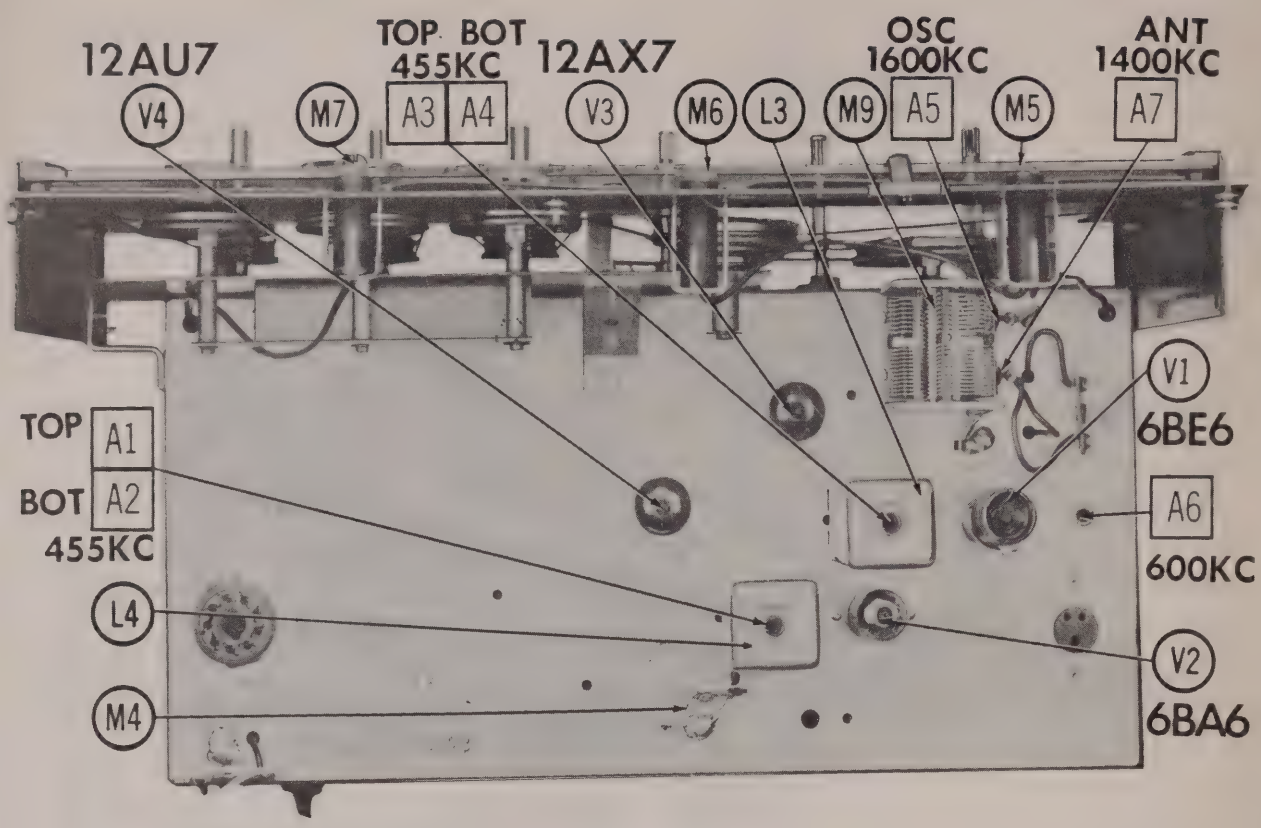
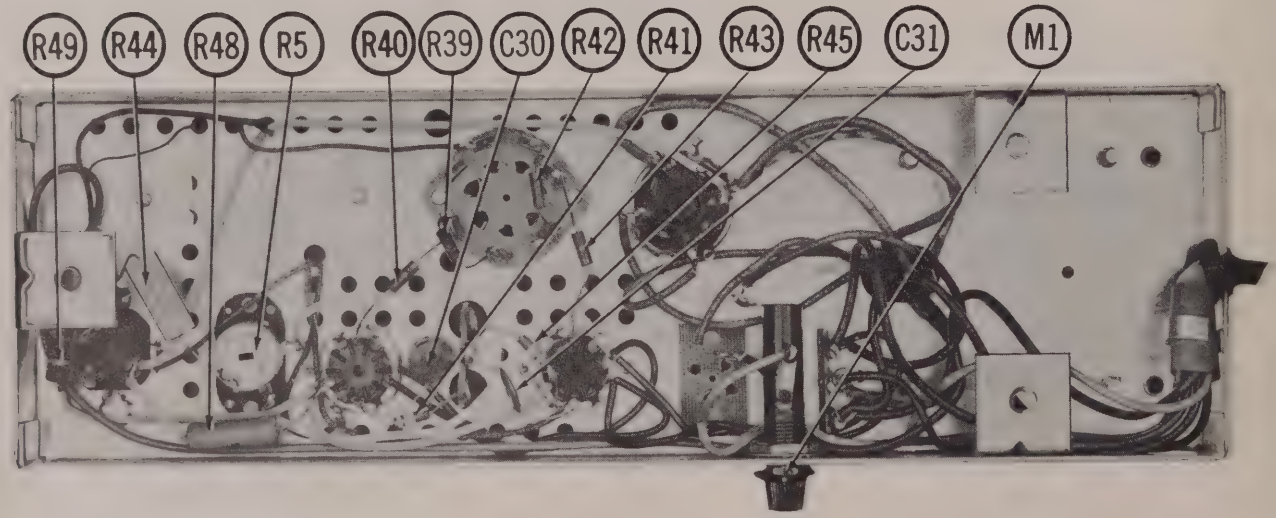


ZENITH MODELS SF174R, SF177E, R (Ch. 3B30, 4B22, 4B23)



TUNER CHASSIS - TOP VIEW



AMP CHASSIS - BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	Converter	6BE6
V2	IF Amplifier	6BA6
V3	AF Amp. -Remote AF Amp	12AX7
V4	AF Amp. -Phase Inv.	12AU7
V5	Output	EL84/6BQ5
V6	Output	EL84/6BQ5
V7	Rectifier	5U4GB

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	450	22-3046	AFH3-43-50	C0344	FP376.9	TMT-39	TVL-3786	
B	▲40	450							
C	▲20	350							
C2	10	25	22-3076	PRS25V10	BBR10-25	TC22	TD-10-25	TVA-1204	
C3	20	400	22-2389	PRS450V20	BR2045	TC75	TD-20-450	TVA-1709	
C4	3	30NP	22-2945	NP-PRS50V4	BBR5-50 † BBR5-50	TCN303	TD-5-50 † TD-5-50	TVAS-1215*	
C5	3	30NP	22-2945	NP-PRS50V4	BBR5-50 † BBR5-50	TCN303	TD-5-50 † TD-5-50	TVAS-1215*	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
† Connect negative leads together.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C6	.047	200		22-2792	P288N-047	DF-503	CUB2S47	GEM-4147	÷2TM-S47	
C7	100			29-2	BPD-0001	DD-101	L10T1	2HV-310	5GA-T1	
C8	100			29-2	BPD-0001	DD-101	L10T1	2HV-310	5GA-T1	
C9	.047	200		22-2792	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C10	2200		10%	22-18	DI-2200			JL-222	5GA-D22S 10%*	
C11	22		N750 10%	22-2903	N750-DI 22	DTN-22	C10Q22C	CN7-422	5TCU-Q22S 10%*	
C12	.01	200	10%	22-2813				GEM-1611	2WF-S10	
C13	1000	1000	10%	22-17				JL-210	10HKB-D1S 10%*	
C14	22		N330 10%	22-2903		TCA-22				
C15	.01	200	10%	22-2813				GEM-1611	2WF-S10	
C16	1000	1000	10%	22-17				JL-210	10HKB-D1S 10%*	
C17	.047	600		22-2794	P688N-047	DF-503	CUB6S47	GEM-1615	6TM-S47	
C18	.047	600		22-2794	P688N-047	DF-503	CUB6S47	GEM-1615	6TM-S47	
C19	330		10%	22-2309	DI-330	D6-331	L10T33	JL-330	5GA-T33S 10%*	
C20	2200		10%	22-18	DI-2200			JL-222	5GA-D22S 10%*	
C21	2200		10%	22-18	DI-2200			JL-222	5GA-D22S 10%*	
C22	.0068	200	10%	22-2819				GEM-16268	5BF-D68	
C23	.1	600		22-2782	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C24	100		10%	29-2	DI-100	DD-101	L10T1	CNO-310	5GA-T1S 10%*	
C25	330		10%	22-2309	DI-330	D6-331	L10T33	JL-330	5GA-T33S 10%*	
C26	330		10%	22-2309	DI-330	D6-331	L10T33	JL-330	5GA-T33S 10%*	
C27	.1	600		22-2782	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C28	.0068	200	10%	22-2819				GEM-16268	5BF-D68	
C29	.0068	200	N075 10%	22-2819				GEM-16268	5BF-D68	
C30	47		N075 10%							
C31	47		10%							
C32	.047	600		22-2794	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C33	.047	600		22-2794	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	ZENITH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2meg	½	63-4383					Loudness
B	2meg	½						Loudness
R2A	1meg	½	63-4384	AB-70	A47-1meg-Z	Q13-137		Bass
B	Shaft			AK-7	FS-3	Not Req.		
R3A	10K	½	63-4386	AB-14	A47-10K-S	Q11-116		Presence
B	Shaft			AK-7	FS-3	Not Req.		

CONTROLS (cont)

ITEM No.	RATING RESISTANCE	RATING WATTS	ZENITH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R4A	1meg	½	63-4385	AB-69	A47-1meg-S	Q11-137		Treble
B	Shaft			AK-7	FS-3	Not Req.		
R5A	50Ω	2(ww)	63-4402	WN-500	A43-50	WPK50	C50P	Balance
B	Shaft			Not Req.	FKS-1/4	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No.	NOTES
R6	10K		63-1828	
R7	68Ω		63-1736	
R8	47K		63-1856	
R9	220K		63-1884	
R10	2.2meg		63-1926	
R11	1.8meg		63-1922	
R12	680K		63-1904	
R13	220K		63-1883	
R14	1.5meg		63-1919	
R15	2.2meg		63-1925	
R16	330K		63-1890	
R17	47K		63-1855	
R18	100K		63-1869	
R19	1000Ω		63-1786	
R20	2.2meg		63-1925	
R21	330K		63-1890	
R22	47K		63-1855	
R23	150K		63-1876	
R24	330K		63-1890	
R25	12K		63-1831	
R26	1500Ω		63-1792	
R27	270K		63-1887	

ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No.	NOTES
R28	47K		63-1855	
R29	47K		63-1855	
R30	22K		63-1841	
R31	2200Ω		63-1799	
R32	100K		63-1870	
R33	47K		63-1855	
R34	10K		63-1827	
R35	2200Ω		63-1799	
R36	150K		63-1876	
R37	150K		63-1876	
R38	470Ω		63-1771	
R39	1meg		63-1912	
R40	1000Ω		63-1786	
R41	330K		63-1890	
R42	1meg		63-1912	
R43	1000Ω		63-1786	
R44	135Ω 5%	2	63-4397	
R45	330K		63-1890	
R46	5600Ω	4	63-3685	
R47	5600Ω	7	63-3986	
R48	1500Ω	3	63-4387	
R49	1200Ω	2	63-3988	

COILS (RF-IF)

ITEM No.	USE	ZENITH PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loopstick	S-40420					
L2	Osc. Coil	S-43104	69-OSC.▲	14-1077■	BC-393*		
L3	Input IF	95-1101	16-6666	BC-368	12-C1*	RF-1*	
L4	Output IF	95-1102	16-6770*	BC-355*	12-C6*		

▲ Drill Mtg. Hole. Disregard Capacity Winding.
■ Drill Mtg. Hole.
* Remove Center Bolt Mtg. Bracket & Use Adapter Plate.
♦ Disregard Capacity Winding.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	ZENITH PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V@ .92A	660 VCT @.120A	5V@ 3A	95-1624	P9314①			PC8422①	24R05U①	R-14A①
	SEC. 3	SEC. 4	SEC. 5							
	6.3 VCT @3A									

① Drill New Mounting Holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	ZENITH PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	6000Ω CT	60Ω	95-1625							
		SEC. 2								
		3.3Ω								

ZENITH MODELS 5T74R, 5T77E, R (Ch. 3B30, 4B22, 4B23)

PARTS LIST AND DESCRIPTIONS (Con't)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ZENITH PART No.	QUAM PART No.	
SP1	12"	PM	6.5Ω	49-852 ①	12A6PA ①	① Parallel And Phase
SP2	12"	PM	6.5Ω	49-853 ①	12A6PA ①	
SP3	5"	PM	3.9Ω	49-856	5A15TZ4	
SP4	3½"	PM	14.0Ω	49-846	3A15T	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			ZENITH PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	2A 250V	136-36	62-17 15-115 (Cap)	312002. (3AG 2A 250V)	342001	AGC2	HKP

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	ZENITH PART No.	ASTATIC PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M2	142-92	*13-TB				* Includes needles and mounting mechanism.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	ZENITH PART No.	JENSEN PART No.	WALCO PART No.	
M3	(78 RPM)	† E-98 or ♦ E-98D		† Jewel ♦ Diamond
	(LP)	† E-98X or ♦ E-98XD		

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		ZENITH PART No.	CBS PART No.	SYLVANIA PART No.	
M4		103-26	1N60	1N295	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M5	Lamp	100-221	#45
M6	Lamp	100-221	#45
M7	Lamp	100-221	#45
M8	Lamp	100-221	#45
M9	Tuning Cap.	22-3086	2 Section, Ant. 7-325mmf, Osc. 6-97mmf
M10	Switch	85-613	Power On-Off (SPST, Snap Type)
M11	Switch	85-612	Phono-Radio (Rotary Wafer Type)
M12	Switch	83-611	Record Compensator, 6 Position (Rotary Wafer Type)

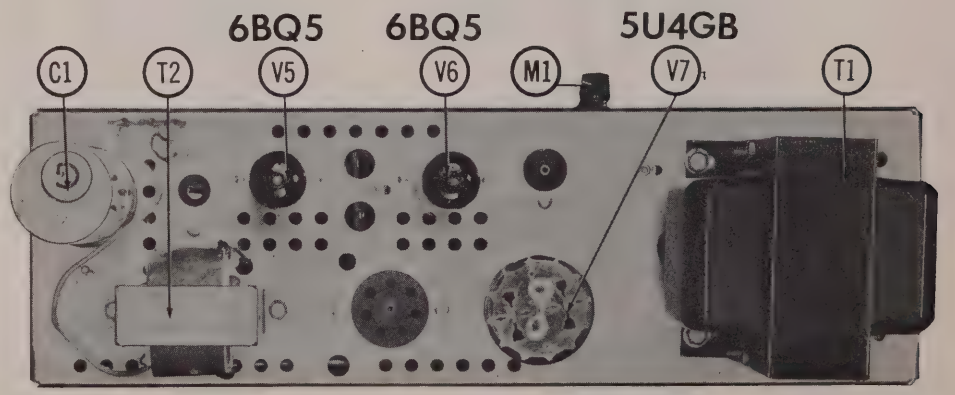
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

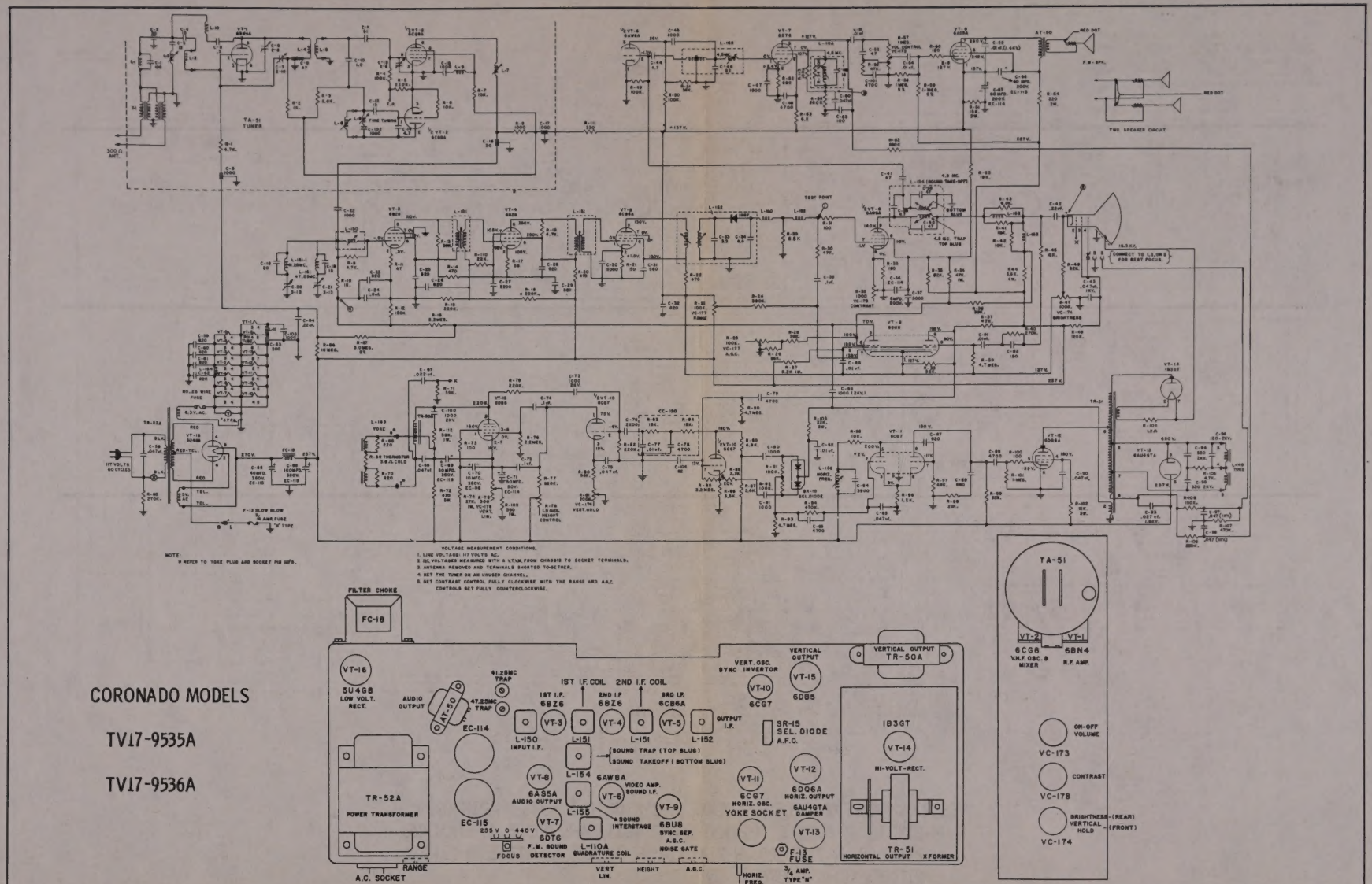
NAME	PART NO.	DESCRIPTION
Knob	S-44166	Tuning, Includes Ring Assembly
Knob	S-44167	Presence, Bass, Treble, Includes Retainer And Spring Assembly
Knob	46-2080	Radio-Phono Record Compensator
Knob	46-2097	Volume
Knob	46-1997	Volume, Remote
Cabinet	14-2480	Top Section, Model SF177
Cabinet	14-2480E	Top Section, Model SF177E
Cabinet	14-2480R	Top Section, Model SF177R
Cabinet	14-2478	Base Frame, Model SF177
Cabinet	14-2478E	Base Frame, Model SF177E
Cabinet	14-2478R	Base Frame, Model SF177R
Cabinet	14-2426	Model SF174R
Leg	96-183	4 Used, Model SF177R
Leg	96-184	4 Used, Model SF177E
Leg	96-185	4 Used, Model SF177
Handle	36-220	Models SF177, E, R
Dial Pointer	59-341	
Dial Crystal	192-267	Models SF177, E, R
Dial Crystal	192-254	Model SF174R
Dial Scale	26-609	Chassis 4B22
Dial Scale	26-610	Chassis 4B23
Indicator Scale	26-622	Presence, Tone

WIRING DATA

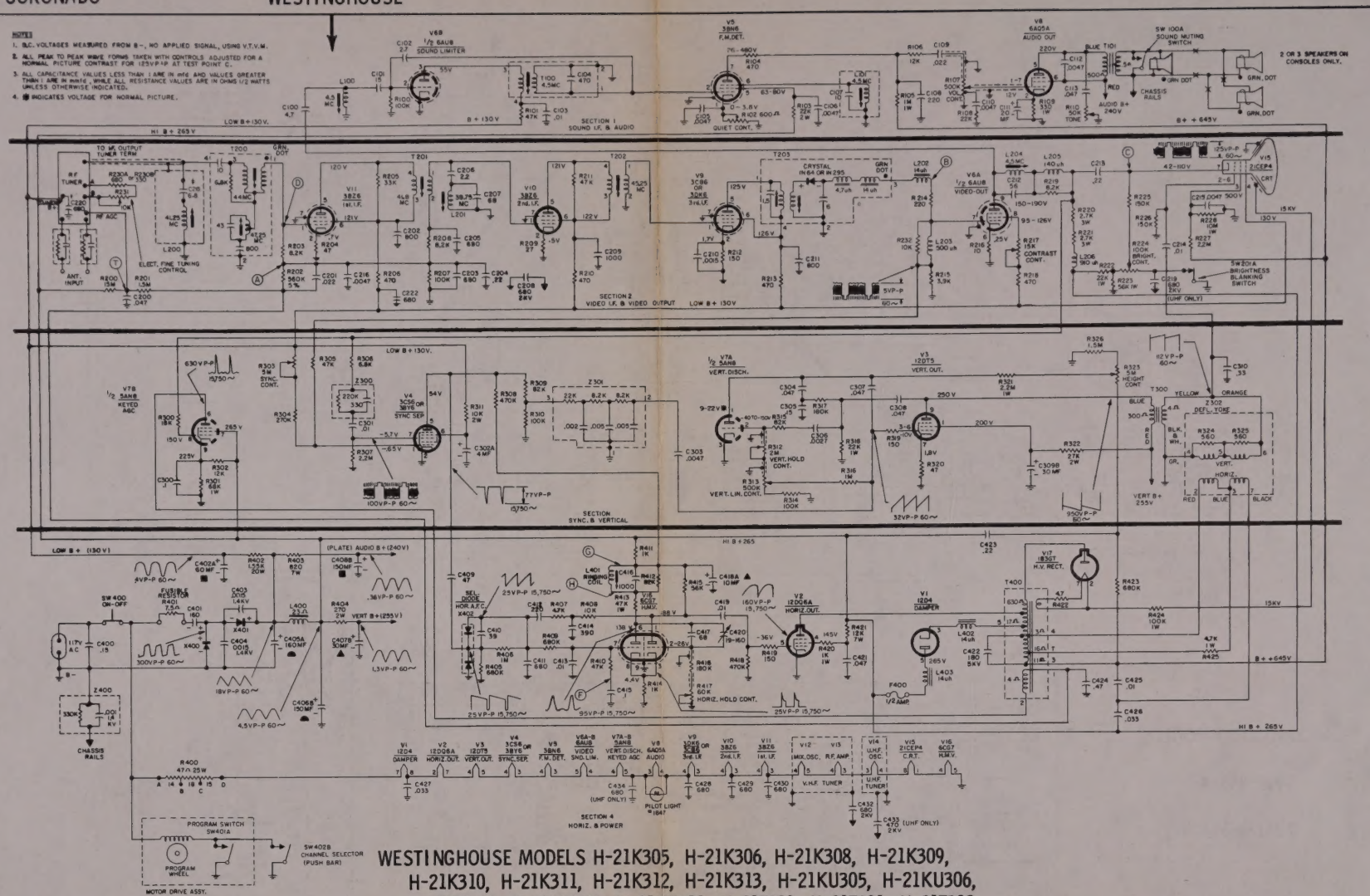
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)



AMP CHASSIS—TOP VIEW



Schematic Diagram Courtesy of Gamble-Skogmo, Inc.


NOTES
1. D.C. VOLTAGES MEASURED FROM B−, NO APPLIED SIGNAL, USING V.T.V.M.
2. ALL PEAK TO PEAK WAVE FORMS TAKEN WITH CONTROLS ADJUSTED FOR A NORMAL PICTURE CONTRAST FOR 123VP-P AT TEST POINT C.
3. ALL CAPACITANCE VALUES LESS THAN 1 ARE IN mfd AND VALUES GREATER THAN 1 ARE IN mmfd, WHILE ALL RESISTANCE VALUES ARE IN OHMS 1/2 WATTS UNLESS OTHERWISE INDICATED.
4. ⊕ INDICATES VOLTAGE FOR NORMAL PICTURE.
SECTION 1 SOUND I.F. & AUDIO
SECTION 2 VIDEO I.F. & VIDEO OUTPUT
SECTION SYNC. & VERTICAL
SECTION 4 HORIZ. & POWER
SW 100A SOUND MUTING SWITCH
SW 200A BRIGHTNESS BLANKING SWITCH
SW 400 ON-OFF
SW 402B CHANNEL SELECTOR (PUSH BAR)
PROGRAM SWITCH SW401A
PROGRAM WHEEL
MOTOR DRIVE ASSY.
CHASSIS RAILS
2 OR 3 SPEAKERS ON CONSOLES ONLY.

WESTINGHOUSE MODELS H-21K305, H-21K306, H-21K308, H-21K309, H-21K310, H-21K311, H-21K312, H-21K313, H-21KU305, H-21KU306, H-21KU308, H-21KU309, H-21KU310, H-21T300, H-21T301, H-21T302, H-21TU302 (CH. V-2376-1, -2)

Schematic Diagram Courtesy of Westinghouse Electric Corp.

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